E. Ancillary Incoming Correspondence

1. To F. Aljibury, SWRCB; From Daniel F. Kriege; November 22, 1983; Subject: Transmittal of Santa Clara County Ordinance and Guidelines used to monitor hazardous material storage facilities

Santa Clara Valley Water District

5750 ALMADEN EXPRESSWAY
SAN JOSE, CALIFORNIA 95118
TELEPHONE (408) 265-2600

November 22, 1983

Mr. Falah Aljibury
State of California
State Water Resources
Control Board
Post Office Box 100
Sacramento, California 95801

Dear Mr. Aljibury:

It was a pleasure to meet you at the ACWA Conference. As we discussed, I told you I would send you copies of the ordinance and guidelines used to monitor hazardous material storage facilities in Santa Clara County.

Enclosed is the City of San Jose Ordinance and this District's guidelines. Most of the cities have an ordinance, with very little change, like the San Jose Ordinance. All cities are using this District's guidelines in connection with their ordinance.

If we can be of additional help on this matter, please let me know. Your Board has a big job ahead on this issue.

Sincerely,

Daniel F. Kriege
Operations and Maintenance Manager

Enclosures

2. To Edward C. Anton; From Richard B. Wilcoxon; Toxic Substances Control Division; February 16, 1984; Subject: AB 1362 and transmitting master list of hazardous substances

State of California

Department of Health Services

Memorandum

AJ1

To : Edward C. Anton, Chief
Division of Technical Services
State Water Resources Control Board
901 P Street

Date : February 16, 1984

Subject: AB 1362
(Underground Tanks)

From : Toxic Substances Control Division
1219 K Street 4-1826

Assembly Bill 1362 (Sher) requires the State Department of Health Services to compile a master list of hazardous substances (Section 25281 (a), Health and Safety Code).

Per your request, the Department has compiled the list of hazardous substances. Section 25280 (c) states:

"25280 (c). 'Hazardous substance' means all of the following liquid and solid substances, unless the department, in consultation with the State Water Resources Control Board, determines the substance could not adversely affect the quality of the waters of the state:

(1) Substances on the list prepared by the Director of the Department of Industrial Relations pursuant to Section 6382 of the Labor Code.

(2) Hazardous substances, as defined in Section 25316.

(3) Any substance or material which is classified by the National Fire Protection Association (NFPA) as a flammable liquid, a class II combustible liquid, or a class III-A combustible liquid."

Section 25280 (c)(1) is attached as Attachment 1.

Section 25280 (c)(2) refers to Section 25316, H&S Code.

Section 25316 states:

"25316. 'Hazardous substance' means:

(a) Any substance designated pursuant to Section 1321 (b)(2)(A) of Title 33 of the United States Code.

(b) Any element, compound, mixture, solution, or substance designated pursuant to Section 102 of the federal act (42 U.S.C. 9602).

(c) Any hazardous waste having the characteristics identified under or listed pursuant to Section 6921 of Title 42 of the United States Code, but not including any waste the regulation of which under the Solid Waste Disposal Act has been suspended by act of Congress.

(d) Any toxic pollutant listed under Section 1317 (a) of Title 33 of the United States Code.

(e) Any hazardous air pollutant listed under Section 7412 of Title 42 of the United States Code.

(f) Any imminently hazardous chemical substance or mixture with respect to which the Administrator of the United States Environmental Protection Agency has taken action pursuant to Section 2606 of Title 15 of the United States Code.

(g) Any hazardous waste or extremely hazardous waste as defined by Sections 25117 and 25115, respectively, unless expressly excluded.

Hazardous substances as defined by Sections 25316 (a), (d) and (e) are included in the list of hazardous substances compiled by the Director of the Department of Industrial Relations pursuant to Section 6382, Labor Code (see Attachment 1).

Hazardous substances as defined by Section 25316 (b) are included as Attachment 2.

Section 25316 (c) refers to 40 CFR 261.31, 261.32, 261.33 (e) and 261.33 (f). The lists are attached as Attachment 3.

The Department is not aware of any action the United States Environmental Protection Agency has taken pursuant to Section 2606 of Title 15 of the United States Code.

Section 25316 (g) refers to statutory definitions of hazardous waste and extremely hazardous wastes, Sections 25117 and 25115, respectively. Attached as Attachment 4 is Section 66680, Lists of Chemical Names and Common Names and Section 66685, List of Extremely Hazardous Wastes. The Department is currently proposing amendments to the two aforementioned Sections. The proposed amendments are attached as attachment 5.

Section 25280 (c) refers to the National Fire Protection Association definition of flammable liquid, Class II combustible liquid, and Class III-A combustible liquid. The definitions are attached as attachment 6. NFPA does not publish a list of chemicals categorized as flammable liquids, Class II combustible liquid, etc. However, data on the flashpoint of individual chemicals are available. Sources for such data may include:

(a) Flash point index of trade name liquids, 9th edition. National Fire Protection Association. Boston, 1978. (See attachment 7).

(b) Fire hazard properties of flammable liquids, gases and volatile soilds, NFPA 325M.

(c) Flammable and combustible liquids code, NFPA 30-1981.

(d) Department of Transportation Hazardous Materials Regulations.

The task of reviewing references at this time for flash point data is beyond the scope of Departmental resources in order to meet your current deadline. Theoretically, the list of flammable liquids, Class II combustible liquid would include thousands of chemicals.

If you have any questions concerning the attached attachments please contact Stanford Lau at 324-1817.

Richard P. Wilcoxon
Chief

Attachments

3. To Governor Deukemejian; From Larry Torgersen: February 24, 1984, Subject: AB 1362

AB 1362

A 38

The Honorable George Deukmejian
The State Capitol
Sacramento, California 95814

Feb. 24, 1984

Dear Governor;

Your signing of AB 1362 regarding underground storage is a slap in the face to an industry or business regulated to Death! Let's get this regulation removed. I really don't believe the automobile industry needs any more of this .

It looks to me as another way to step around proposition 13.

Larry Torgersen

LARRY TORGERSEN FORD
1105 Northcrest Dr.
Crescent City, CA 95531

STATE OF CALIFORNIA

TRANSMITTAL OF CORRESPONDENCE

STD. 100A (REV. 10-82)

(Instructions on reverse and SAM Section 0210)

3-0188

COLOR CODE: GOLDENROD—KEEP WITH CORRESP; GREEN—GOVERNOR'S FILE COPY; CANARY—SUSPENSE COPY; PINK—AGENCY COPY; BLUE—DEPARTMENT COPY

☐ STATE AND CONSUMER SERVICES	☐ BUSINESS, TRANSP. AND HOUSING	☒ ~~HEALTH AND~~ WELFARE	☐ RESOURCES	
___ CONSUMER AFFAIRS	___ ABC	___ AGING	___ BOATING & WATERWAYS	___ ADMINISTRATIVE LAW
___ FAIR EMP. & HOUSING	___ BANKING	___ ALCOHOL & DRUG PROG	___ CCC	___ ARTS COUNCIL
___ FIRE MARSHAL	___ CHP	___ DATA CENTER	___ COASTAL COMMISSION	___ ATTORNEY GENERAL
___ FTB	___ CALTRANS	___ DEVELOPMENTAL SERV	___ CONSERVATION	___ BOARD OF CONTROL
___ GENERAL SERVICES	___ CORPORATIONS	___ EDD	___ ENERGY RES COMM	___ BOARD OF EQUALIZATION
___ PERS	___ ECON. DEVELOPMENT	X ~~HEALTH SERVICES~~	___ FISH & GAME	___ COMMUNITY COLLEGES
___ SPB	___ HOUSING & CD	___ MENTAL HEALTH	___ FORESTRY	___ CONTROLLER
___ TEACH RET SYS	___ INSURANCE	___ REHABILITATION	___ PARKS & RECREATION	___ CRIMINAL JUSTICE PLANNING
___ VETERAN AFFAIRS	___ DMV	___ SOCIAL SERVICES	___ STATE LAND DIV	___ EDUCATION
☐ FINANCE	___ REAL ESTATE	___ STATEWIDE HEALTH PLANNING	___ DWR	___ OFFICE OF EMERGENCY SERV
☐ FOOD & AGRICULTURE	___ SAVINGS & LOAN	___	___	___ LT GOVERNOR
☐ INDUSTRIAL REL	___	☐ YOUTH & ADULT CORRECTIONAL AGENCY	☒ ENVIRONMENTAL AFFAIRS	___ MILITARY
___	___	___ BD OF CORRECTIONS	___ AIR RES BOARD	___ PERSONNEL ADMINISTRATION
___	___	___ CORRECTIONS	___ SOLID WASTE MANAGE MENT BOARD	___ OFF OF PLNG. & RESEARCH
___	___	___ *PRISON TERMS*	X *WR CONTROL BOARD*	___ PUC
___	___	___ YOUTH AUTHORITY	___	___ SECRETARY OF STATE
___	___	___ YOUTHFUL OFFENDERS PAROLE BOARD	___	___ STATE UNIVERSITIES
				___ STUDENT AID COMMISSION
				___ TREASURER
				___ UNIV OF CALIF.
				___
				___

DATE OF INCOMING: **February 24, 1984**

CORRESPONDENT & ADDRESS:

Larry Torgersen/ Ford
1105 Northcrest Drive
Crescent City, CA 95531

Signing of AB 1362 - underground storage

☒ **FROM GOVERNOR'S OFFICE**

___ ADMINISTRATION
___ APPOINTMENTS SECTION
___ CABINET SECTION
___ EXECUTIVE SECTION
___ LEGAL AFFAIRS
X LEGISLATIVE SECTION
___ PRESS SECTION
___ PUBLIC AFFAIRS
___ RESEARCH
___ SCHEDULING
___ CORRESPONDENCE UNIT
___

☐ **FROM LT. GOV'S OFFICE**

GOVERNOR'S OFFICE USE

INSTRUCTION TO ☒ *AGENCY* ☐ *DEPARTMENT* ☐ *OFFICE*

☐ TAKE WHATEVER ACTION YOU CONSIDER APPROPRIATE

☐ REPLY DIRECT CC

☒ PREPARE SUGGESTED REPLY AND RETURN WITH THE ATTACHED

☐ PREPARE SUGGESTED REPLY TO BE USED AS FORM RESPONSE HOLDING

☐ COORDINATE REPLY WITH _____

FROM ▸ **Bob Williams**

DATE OF TRANSMITTAL **3-13-84**

GOVERNOR'S OFFICE DUE DATE

GOVERNOR'S OFFICE APPROVAL BY ▸

AGENCY OFFICE USE

INSTRUCTIONS TO DEPARTMENT

☐ TAKE WHATEVER ACTION YOU CONSIDER APPROPRIATE & NOTIFY GOV OFC & AGENCY (COPIES IF ANSWERED)

☐ HANDLE AS INDICATED ABOVE (Return all suggested replies via agency office)

☐ FURNISH GOV OFC & AGENCY WITH COPIES

☐ REPLY DIRECT

☐ _____

☒ PREPARE REPLY FOR SIGNATURE OF _____ AND RETURN WITH THE ATTACHED

☐ COORDINATE REPLY WITH _____

FROM ▸ Donovan

DATE OF TRANSMITTAL 3/14/84

AGENCY OFFICE DUE DATE 3/28/84

AGENCY APPROVAL BY 4/5/84 ▸

DEPARTMENT USE

INSTRUCTIONS TO _____

☐ HANDLE AS INDICATED ABOVE (Return all suggested replies via dept office)

☐ *REPLY DIRECT*

☐ *FURNISH DEPARTMENT HEAD WITH A COPY*

☐ SPECIAL INSTRUCTIONS _____

☐ PREPARED BY _____ TELEPHONE _____

FROM ▸

DATE OF TRANSMITTAL

DEPARTMENT DUE DATE

DEPARTMENTAL APPROVAL BY ▸

4. To Harold Singer; From Bob Cleveland, Northern California Fire Prevention Officer; March 8, 1984; Invitation to Fire Chief's Workshop in Palo Alto

T. F. 4

California Fire Chiefs Association

NORTHERN DIVISION - FIRE PREVENTION OFFICERS' SECTION

March 8, 1984

CALIFORNIA REGIONAL WATER

MAR 12 1984

QUALITY CONTROL BOARD

Mr. Harold Singer
1111 Jackson St.
Room 6040
Oakland, CA 94607

Dear Mr. Singer,

Enclosed is the flyer announcing the workshop in which you have very generously consented to participate.

We will be using the old City of Palo Alto Council Chambers which should be a comfortable setting with a fairly good sound system.

We have mailed out 140 announcements — 100 to Fire Departments which have members in our organization, and the rest to Associate members. We have also suggested to the membership that other agencies and/or officials are welcome and should be invited. We have high hopes for a turnout of 50 to 75 people from around northern California.

We ask that you take one half hour or so (more time if you wish) to give us an overview regarding guide lines development and the leak problems from the RWCB perspective. You may anticipate that most questions directed to you will be on two subjects: the guidelines, and RWCB procedures regarding investigation and clean up after unauthorized discharges have occurred. We will try to keep to the subject of the legislation but many fire agencies are very tuned into the after the fact handling of spills.

If you will need equipment such as slide or overhead projectors, please call me at (415) 329-2233, Joel Berk at (415) 364-1100, or Dave Milanese at (415) 574-5555.

We will look forward to seeing you and you will, of course, be our guest for lunch.

Sincerely,

Bob Cleveland

Bob Cleveland
Northern California Fire Prevention Officers

BC:bah

California Fire Chiefs Association

NORTHERN DIVISION - FIRE PREVENTION OFFICERS' SECTION

WORKSHOP ANNOUNCEMENT

"THE SHER BILL"
What you always wanted to know...
(but didn't know who to ask)

Subject: AB 1362 (Chapter 1046 H&S Code)
AB 3565 (trailer bill to AB 1362)

Location: City of Palo Alto Cultural Center
1313 Newell Road
(see directions on reverse)

Date: March 16, 1984

Time: Start at 9:00 AM with coffee & donuts; continue until productive work is completed or 3:30 PM, whichever is sooner.

Fee: $10 per person payable at the door (includes coffee/donuts — does not include lunch.)

Guest panelists:

Kip Lipper, Administrative Assistant to Assemblyman Sher.

Harold Singer, Water Resources Engineer, California Regional Water Quality Board.

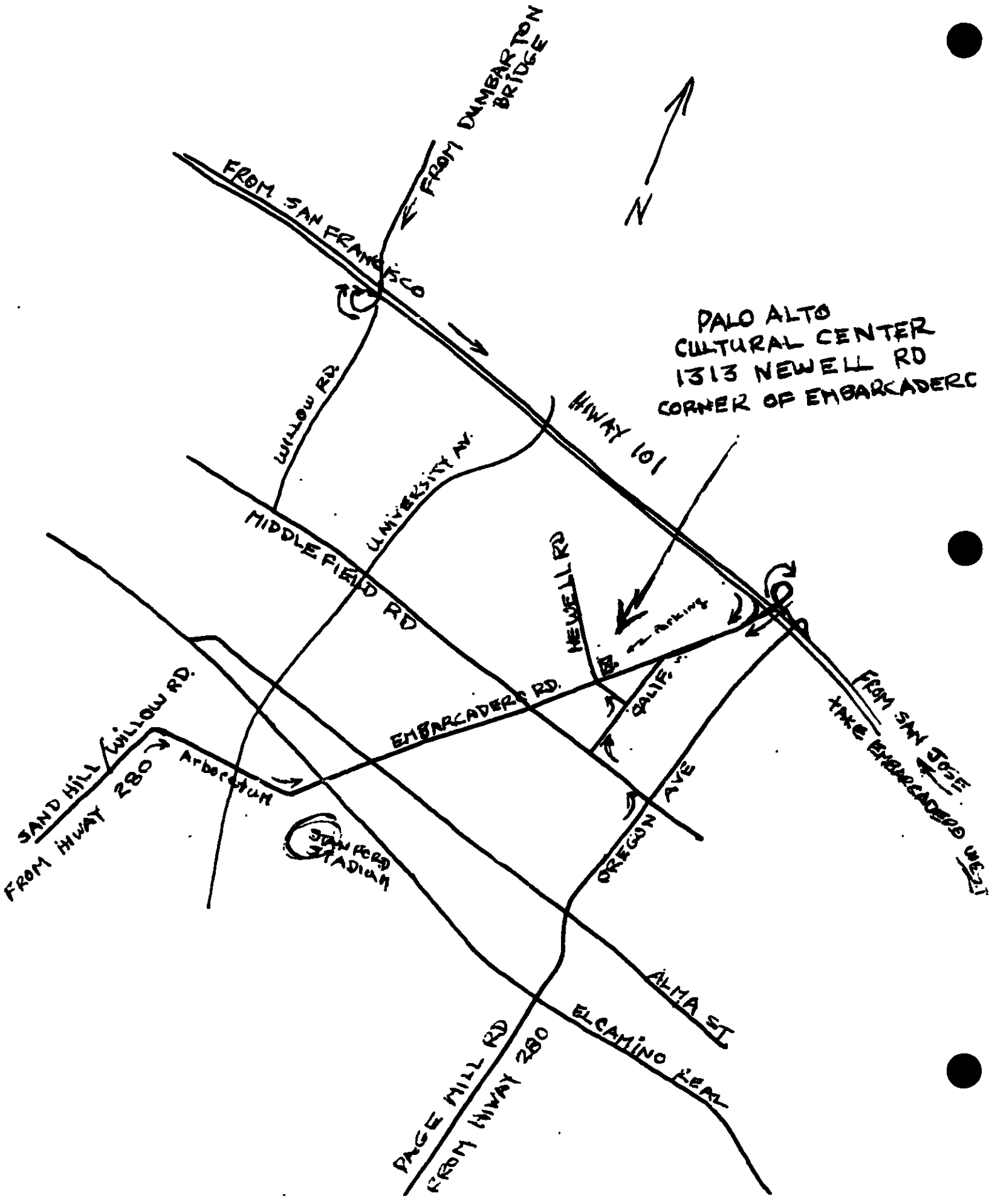
Joan Jennings, Legislative Staff Manager, Office of the California State Fire Marshal.

Moderator:

Jim McLaughlin, Judge Advocate and Chairman of the Legislative Committee, Northern California Fire Prevention Officers Association.

The format will be a panel type discussion with opening remarks by each guest and then further discussion based on questions from the floor. Written questions will receive priority. This workshop is intended as an educational experience for the Northern California Fire Prevention Officers and our guests. It is not intended as a public forum to debate the issues and merits of the legislation.

If you, personally, or your committee have developed information or suggestions you wish to input in regards to the subject legislation, please come prepared with that information or suggestion in writing. Copies of AB 3565 are enclosed for your convenience.


FROM DUMBARTON BRIDGE
FROM SAN FRANCISCO
N
PALO ALTO
CULTURAL CENTER
1313 NEWELL RD
CORNER OF EMBARCADERO
WILLOW RD.
HIWAY 101
UNIVERSITY AV.
MIDDLE FIELD RD
NEWELL RD
EMBARCADERO RD.
ALMA ST
EL CAMINO REAL
OREGON AVE
PAGE MILL RD
FROM HIWAY 280
SAND HILL
FROM HIWAY 280
Arboretum
STANFORD STADIUM
FROM SAN JOSE
TAKE EMBARCADERO WEST

5. To Harold Singer; From Frederick J. Taugher, Public Policy Advocates; March 26, 1984; Subject: Position Papers Sent to the Assembly Committee on Consumer Protection and Toxic Materials in Support of AB 3781 and AB 3901

FREDERICK J TAUGHER

PUBLIC POLICY ADVOCATES

1100 11th Street, Suite 311
Sacramento, California 95814
Telephone 916 441 0702

March 26, 1984

Mr. Harold J. Singer
California Regional Water
Quality Control Board
San Franciso Bay Region
1111 Jackson Street, Room 6040
Oakland, CA 94607

Dear Harold:

The two bills (AB 3781 and AB 3901) sponsored by Hunter Environmental Services, Inc., and Mallory Capacitor Company, have been set for hearing on April 3 by the Assembly Committee on Consumer Protection & Toxic Materials. I have enclosed a copy of the position paper which we have sent to each member of the committee.

Naturally, we would appreciate your support for these important bills. I would also appreciate hearing soon any comments or criticisms which you may have.

Sincerely,

Frederick J. Taugher

Enclosure

A

FREDERICK J TAUGHER

PUBLIC POLICY ADVOCATES

1100 11th Street, Suite 311
Sacramento, California 95814
Telephone 916 441 0702

March 23, 1984

TO: All Members, Assembly Committee on Consumer Protection & Toxic Materials

FROM: Fred Taugher

RE: Support for AB 3781 and AB 3901

Assembly Bills 3781 (Sher) and 3901 (Cortese) are set for hearing by the Assembly C.P. & T.M. Committee on Tuesday, April 3. On behalf of my clients, Hunter Environmental Services, Inc., and Mallory Capacitor Company, I wish to urge your SUPPORT for these two groundwater protection bills.

Each bill relates to the risks of hazardous substance underground storage tank leaks. Landmark legislation on this subject was enacted last year, but as the danger of groundwater contamination becomes more and more apparent and as the technology for controlling the problem steadily improves and becomes better understood, we believe it is appropriate to reflect these developments by amending California law.

Two of the latest engineering developments for the protection of groundwater are (1) the "precision" test (a generic definition for a test standard adopted by the National Fire Protection Association), and (2) new devices which can continuously (24 hours per day) monitor for storage tank leaks and provide immediate alert when a leak is detected. Although each of these have been used for several years, neither the "precision" test nor continuous monitoring devices were known to the Legislature when previous bills relating to underground storage tanks were enacted. AB 3781 and AB 3901 therefore respond to this improved technology.

AB 3781 maintains the scope and intent of the major existing law (Assemblyman Sher's AB 1362, Chapter 1046, Statutes of 1983) regulating underground storage tanks, i.e., it does not disturb the relationships amongst the various regulatory authorities nor does it modify the distinctions between new and existing tanks and

PUBLIC POLICY ADVOCATES

between motor vehicle fuel tanks and other tanks. It does, however, update some of the tank testing and monitoring requirements. We believe some of these changes are considerably more cost effective than existing provisions and that each of the changes improves the level of groundwater protection. The following pages present a side-by-side comparison between the testing and monitoring requirements established by AB 1362 and the new requirements proposed by AB 3781.

AB 3901 is a natural sequel to Assemblyman's Cortese's AB 2013 (Chapter 1045, Statutes of 1983) which now requires owners of underground tanks and other containers holding hazardous substances to provide specified information on their tanks and tank contents to the State Water Quality Control Board. Combining the AB 2013 information with known hydrogeologic facts the board now has the ability to determine which particular tanks in California pose the greatest danger to the environment and public health. For instance, the board can predict which tanks, because of the age and material of the tanks themselves and the nature of their contents and surrounding soil, are most likely to leak in the near future. Further, the board can ascertain which of those presents significant danger because of proximity to groundwater.

This bill would require the board to produce an inventory of such "high risk" tanks. Subsequently, operators of known "high risk" tanks would be required to perform a "precision" test, make repairs, if necessary, and install a continuous monitoring device. We believe this bill offers strong public health and environmental protection where it is most needed and can, at a relatively modest cost, protect tank owners against highly probable liabilities.

One gallon of gasoline can contaminate one billion gallons of water. Last November, the EPA's assistant administrator for water told a U.S. Senate Committee that 75,000 to 100,000 storage tanks were leaking 11 million gallons of gasoline annually and that the number was increasing. Clearly, tanks leaking gasoline and even more harmful substances are a serious threat to public health. We believe that Californians deserve the best protection against contamination that technology can provide. For these reasons, we ask you to vote AYE on AB 3781 and 3901.

TESTING AND MONITORING REQUIREMENTS
UNDERGROUND STORAGE TANKS

EXISTING--AB 1362 (Chapter 1046, Statutes of 1983)	PROPOSED--AB 3781
Existing Motor Vehicle Fuel Tanks	**Existing Motor Vehicle Fuel Tanks**
Regulations may require: --daily gauging and inventory reconciliation --hydrostatic or pressure tests at specified intervals --installation of leak detection device in piping.	Would substitute "precision" test for hydrostatic or pressure test (N.B., the NFPA has stated that pressure tests are unreliable and dangerous). Would keep daily gauging, inventory reconciliation and leak detection device installation as actions that may be required and would add, as a further alternative, continuous monitoring systems.
Other Existing Tanks	**Other Existing Tanks**
Must retrofit an undefined monitoring system. If visual inspection is not practical, regulations may also require: --pressure, vacuum, or hydrostatic tests. --down gradient monitoring wells..	Same, except that the "precision" test is substituted for the other test descriptions and the requirement that monitoring wells be "down gradient" is repealed (N.B., wells need not be "down gradient" to be effective). Would also add, as an additional regulatory alternative, continuous monitoring systems.
Secondary Containment	**Secondary Containment**
All new tanks (except those storing motor vehicle fuel) must have "secondary containment", i.e., containment external to, and separate from, the primary containment (typically a vault). New tanks containing motor vehicle fuel are exempt from this requirement if the tank is manufactured from an approved material and is installed in conjunction with a system that will direct leaks to a monitoring well.	Existing requirements are maintained and double-walled tanks, equipped with a continuous monitoring system, are authorized as an alternative to these existing requirements. (This alternative would provide considerably better protection than existing requirements for motor vehicle fuel tanks and would provide somewhat better protection--at much less cost--than existing secondary containment requirements for other tanks).
New Tank Installation	**New Tank Installation**
No testing for tank integrity is now required before placing new tanks into service.	Two tests adopted by the National Fire Protection Association would be required before a new tank is placed in service:

...continued on next page

(a) before the new tank is covered or enclosed by earth, new tanks shall be tested in accordance with the test specified by the NFPA's Flammable and Combustible Liquids Code, and
(b) after the new tank is covered and filled, but not yet in service, the NFPA "precision" test shall be performed.

Repair of Motor Vehicle Fuel Tanks

If a tank develops a leak, it may be repaired once by an approved interior coating following:

(a) an ultrasonic or hydrostatic test,
(b) a vacuum test, and
(c) the standard installation test specified by the NFPA's Flammable and Combustible Liquids Code.

Repair of Motor Vehicle Fuel Tanks

Existing requirements are supplemented by the following two requirements:

(a) a "precision" test shall be performed once the tank is in operating condition, and
(b) the board is directed to require the installation of a continuous monitoring system.

AB 3781 & 3901 Definitions

"Test" or "testing" means the Precision Test as defined by the National Fire Protection Association (NFPA) Pamphlet 329, "Recommended Practice for Handling Underground Leakage of Flammable and Combustible Liquids," as amended, for proving the integrity of an underground storage tank.

Note: Section 4-3.10.1 of that NFPA pamphlet reads, "Precision Test, as used throughout this pamphlet, means any test that takes into consideration the temperature coefficient of expansion of the product being tested as related to any temperature change during the test, and is capable of detecting a loss of 0.05 gal (190 ml) per hour." NFPA Pamphlet 329 was adopted by the NFPA membership at its Annual Meeting on May 18, 1983, with an effective date of June 29, 1983. The edition of the standard has also been approved by the American National Standards Institute (ANSI).

"Monitoring system" means a continuous leak detection and alarm system which is located in monitoring wells adjacent to an underground storage tank and which is approved by the local agency.

6. To Ronald W. Bogardus, State Fire Marshal, forwarded to Harold Singer for response; From William B. Stead, Corrosion Engineer; April 5, 1984; Subject: Controversy Over Interpretation of Section 25284(a)

WESTERN REGION

March 19, 1984 forwarded April 5

Ronald W. Bogardus, P.E.
State Fire Marshal
7171 Bowling Dr., Suite 600
Sacramento, CA 95823

Dear Chief Bogardus,

The passage of AB 1362 (Sher) has caused considerable controversy over the interpretation of Section 25284 (a)(7) and I need your assistance.

The review of AB 1362 by Joan Jennings in the Nov/Dec. 1983 issue of SFM states in paragraph two (2) under Construction Standards that "tanks for motor vehicle fuels storage installed after June 30, 1984 need not meet the design and construction requirements if the primary containment construction is of glass fiber reinforced plastic, cathodically protected steel, or steel clad with glass fiber reinforced plastic and has a leak monitoring system or if the tank has a monitored pressured piping system". My understanding is that under the conditions of this paragraph Dual Containment is not required.

My comments are directed specifically to cathodically protected steel tanks and steel tanks clad with glass fiber reinforced plastic which should also be cathodically protected because of the "Coating Holidays" that occur. It should be required that all metal underground tanks and piping be protected from corrosion (1982 UFC Sec. 79.603) by properly installed coatings and a cathodic protection system designed and maintained by or under the supervision of a Registered Corrosion Engineer or Corrosion Specialist certified by NACE (National Association of Corrosion Engineers). The annual maintenance/inspection could be implemented, tagged and reported like fire extinguishers and automatic extinguishing systems.

Maintenance is vital to an effective cathodic protection system. Buried metal fuel tanks properly maintained will last virtually "corrosion free" indefinitely. This has been a known fact throughout the corrosion community over the last 30 years and is readily substantiated.

At this time it is estimated that Dual Containment steel tanks will cost two to three times that of existing single wall steel tanks. Since it is estimated that 90% of the underground storage tanks are for motor fuel, substantial savings to the public and business community would be achieved by using cathodic protection on steel tanks. The ideal system is a well coated tank, piping and fittings with cathodic protection. Usually a Galvanic System is adequate in this situation at substantially less investment than for an Impressed Current System. There needs to be a "proper balance between public and environmental safety and fairness and equity to the business community"! Jurisdictions should not require Dual Containment only for motor fuel storage.

As Fire Chief of a mountain community, I am very much aware of environmental preservation, and as a registered corrosion engineer I know what has been done to prevent corrosion of buried tanks.

NACE has developed guidelines for cathodic protection of buried fuel tanks which are due to be published soon. I have submitted to the Fire Prevention Officers' Flammable Liquids Committee a relatively simple but effective Monitoring System which if used in conjunction with a Suction Delivery System will permit early detection of any leak should it occur.

California Fire Chiefs' Association asked the Fire Prevention Officers to "research and propose means of implementing AB 1362 into the Fire Code". I have been attending the Flammable Liquids Committee (FPO) meetings and find that some local jurisdictions have determined that AB 1362 means all underground fuel tanks will be Dual Containment. In view of the monetary impact, will you please get a ruling from the State Attorney General's office as soon as possible? I am also requesting Assemblyman Sher to give me his intention when he authored AB 1362.

Your timely response will be greatly appreciated.

Yours very truly

William R. Stead

WILLIAM R. STEAD, P. E.
Corrosion Engineer
Fire Chief - Mt. Baldy Fire Department
Western Region Director - NACE

Attachment
CC Assemblyman Sher
Assemblyman Lancaster
Assemblywoman Tanner
San Bernardino County Fire Chiefs' Association
Los Angeles County Fire Chiefs' Association
California Fire Chiefs' Association
WRS:MHB

APR 11 1984

STATE OF CALIFORNIA—STATE AND CONSUMER SERVICES AGENCY GEORGE DEUKMEJIAN, Governor

STATE FIRE MARSHAL
7171 BOWLING DRIVE, SUITE 600
SACRAMENTO, CALIFORNIA 95823
(916) 427-4161
ATSS 466-4161

April 5, 1984

6-4155
427-4155

1) ~~Ltr~~ (no letter attached) LS
2) LJ John Ltr called and got the letter they are referring to us for reply Ltr

Mr. William Stead
Western Region Director
National Association of Corrosion Engineers
675 Bonita Avenue
Pomona, CA 91767

Dear Mr. Stead:

Thank you for your recent letter regarding AB 1362 and the controversy over the interpretation of the bill as it relates to dual containment requirements.

As you know, the State Water Resources Control Board is responsible for the implementation of this new law and is currently in the process of developing regulations. In view of this, I believe it would be appropriate for the Board to address the issue you have raised with respect to dual containment requirements. I have, therefore, taken the liberty of forwarding your letter to the Board for reply.

For your information, Assemblyman Sher has introduced AB 3447, AB 3565 and AB 3781 in follow-up to AB 1362. If you feel a clarification of this issue is needed, you may wish to consider contacting Assemblyman Sher's office regarding the possibility of an amendment to clear up any ambiguity and eliminate the confusion.

I appreciate your concern in this matter and it is my hope that this issue can be resolved to everyone's satisfaction.

Sincerely,

Ronald W. Bogardus

RONALD W. BOGARDUS, P.E.
State Fire Marshal

RWB:JJ:ri

cc: Honorable William Lancaster
State Water Resources Control Board

[redacted]

APR 12 1984
DIVISION OF TECHNICAL SERVICES

7. To Harold Singer; From Richard Casagrande, Co-Chairman Lo. G.H.M.A.; April 27, 1984; Subject: Invitation to Meeting to Discuss Underground Tank Regulations

LOCAL GOVERNMENTAL HAZARDOUS MATERIALS ASSOCIATION

— LOGHMA —

" established to maintain an educational forum for the enhancement of those dedicated to hazardous and toxic materials programs."

April 23, 1984

CALIFORNIA REGIONAL WATER

APR 27 1984

QUALITY CONTROL BOARD

Harold Singer
State Water Quality Control Board
3201 Valley Region
Sacramento, CA 95816

Dear Harold,

This letter is a request by Lo.G.H.M.A. for you to be our guest speaker at our regular meeting, to be held May 10, 1984, at the Kern County Health Department, 1700 Flower Street, Bakersfield.

As I explained to you earlier, this association is represented by professionals working in local Hazardous Materials Management programs. Pursuant to the Sher Bill, we have had many meetings and discussions to develop some level of expertise in dealing with underground storage of hazardous substances; your discussions with us I'm sure will be of value to both the State and to each local Health Department.

Enclosed please find our map to the Bakersfield office; if you need a ride from the airport to the meeting, please let us know. Looking forward to seeing you.

Sincerely,

Richard Casagrande aa

Richard Casagrande
Co-chairman

RC/aa

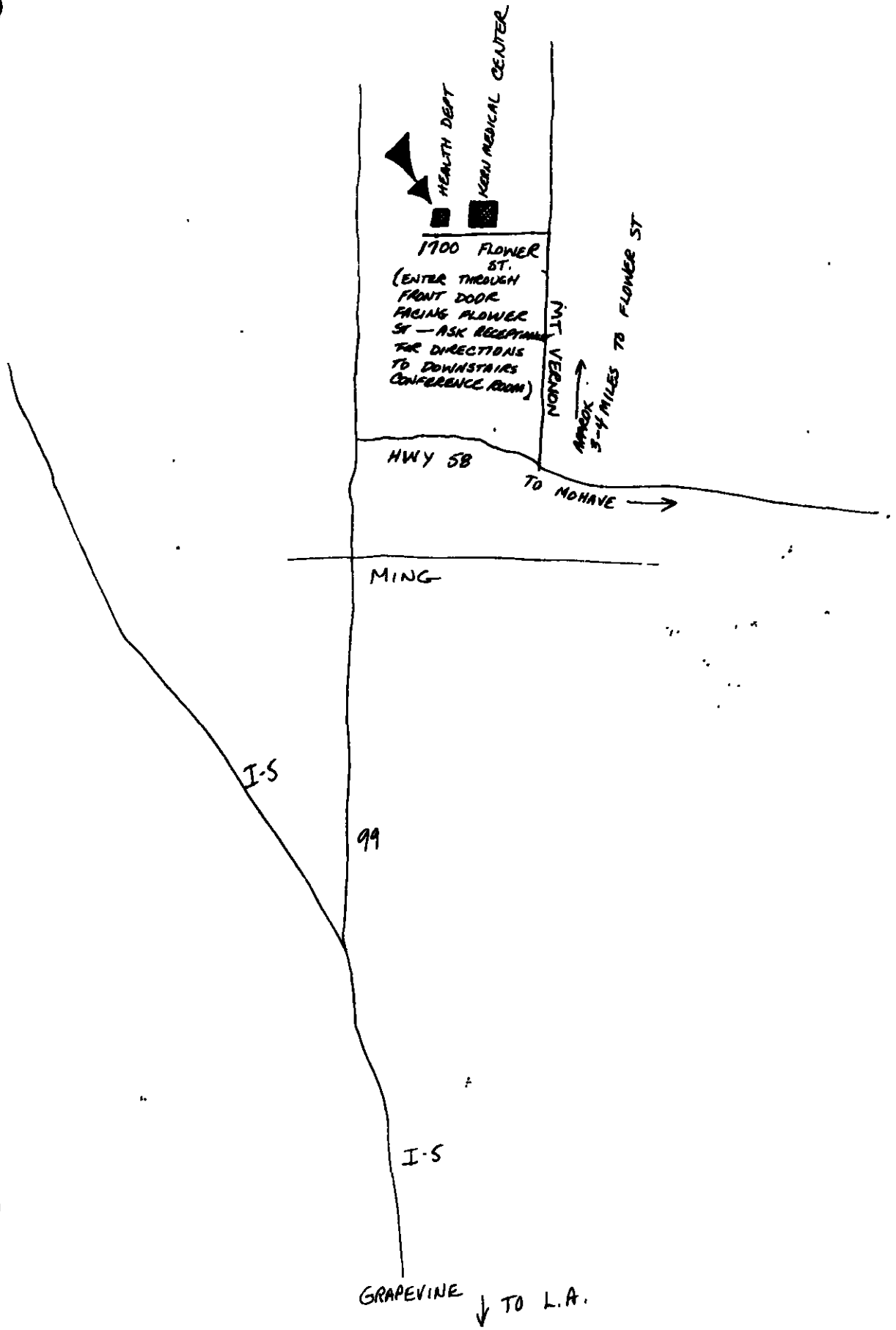
Encl.

Representing Professionals Working in City and County Governments

10 am - 6 pm

Los Angeles County, San Bernardino Co., Kern County, Ventura County, San Diego County Long Beach City, Riverside County, Santa Barbara Co., San Luis Obispo Co. Pasadena City, Fresno County, Orange County, Imperial County

805-861-3636


HEALTH DEPT
KERN MEDICAL CENTER
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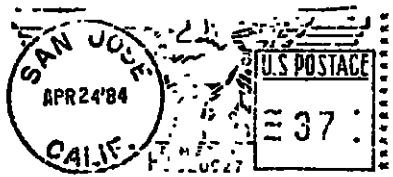
(ENTER THROUGH FRONT DOOR FACING FLOWER ST — ASK RECEPTIONIST FOR DIRECTIONS TO DOWNSTAIRS CONFERENCE ROOM)
MT VERNON
APPROX 3-4 MILES TO FLOWER ST
HWY 58
TO MOHAVE
MING
I-5
99
I-5
GRAPEVINE
TO L.A.

8. To Carole Onorato; From Thomas L. Robinson, V. P., Robinson Oil Company; Subject: Possibility of CIOMA Member(s) Serving on an Industry Advisory Committee

ROBINSON OIL CO. INC.
4250 WILLIAMS ROAD
SAN JOSE, CALIFORNIA 95129



Ms. Carole Onorato
Chairwoman, State Water Resources Control Board
901 P Street
Sacramento, CA 95814

IV.E-8, 4/27 1. CAO 2. WGP

Robinson Oil Company, Inc.

4250 WILLIAMS ROAD • SAN JOSE, CALIFORNIA 95129 • TELEPHONE (408) 255-9531

April 24, 1984

Staff any comment CAO 4/30

ECA Include this group in early review process - respond directly advising Robinson of status of development

Ms. Carole Onorato
Chairwoman, State Water Resources Control Board
901 P Street
Sacramento, CA 95814

Dear Ms. Onorato:

cc: CAO

Thank you for taking the time out of your busy schedule to address our California Independent Oil Marketers Association (CIOMA) Convention on the subject of hazardous materials storage regulations.

I think it is always worthwhile for industry to have the opportunity to meet and hear the point of view of the governmental agencies which regulate it. A better understanding is gained by both sides through this interchange.

During the question and answer session after your presentation, the question was asked concerning the possibility of a CIOMA member or members serving on an industry advisory group assisting the Board in developing the various standards relating to petroleum storage. Should this be possible, I believe, we could make a positive contribution to a fair, reasonable, and workable solution to the task of protecting the groundwater. The solution to this problem is of vital interest to CIOMA members since we not only own and operate underground tanks, but supply industrial, agricultural, commercial, and governmental customers who own and operate underground tanks. Should it not be possible to be on any advisory groups we would ask to be included on any appropriate mailing lists.

Thank you for your consideration on this matter and again thank you for addressing our membership.

Sincerely,

Thomas L. Robinson

Thomas L. Robinson
Vice President, Robinson Oil Company
Committee member, CIOMA Operations and Engineering Committee

MAY 3 1984
DIVISION OF

cc Mitch Dion, President, CIOMA
Jim Divine, Executive Vice President, CIOMA
Bob Shuster, Chairman, CIOMA Operations and Engineering Committee
Les H. Cohen, Les H. Cohen & Associates.

TLR/me

9. To Carole A. Onorato; From Richard Fahey, Diablo Petroleum; April 25, 1984; Subject: Request for exemption from monitoring small tanks with suction pumps

DPI
Diablo Petroleum Inc.

5/7 1. CAO 2. WGP
This needs the expertise of WGP for response!
CAO 5/8

April 25, 1984

orig. - Anton Suggested Reply for WGP CAO by 5/11/84 sy.

Ms. Carole Onorato
State Water Resources Control Board
P. O. Box 100
Sacramento, CA 95802-0100

Dear Ms. Onorato:

Last week at the California Independent Oil Marketers Meeting at Tahoe, I heard your address on the Sher Act regulations which you will be promulgating this fall.

Because you sounded both reasonable and practical, I am emboldened to write you in behalf of an unorganized group of tank owners. These are the businesses, individuals, municipalities, fire departments, etc. who have small tanks with suction pumps.

The statistical probability of such facilities contaminating the water supply is slight because: their combined capacity is small; the tanks are only 4 to 6 feet in diameter, (which means their burial depth is 6 feet to 8 feet); and their suction pumps will not function if a hole develops in the product line.

This last point is critical. Many spills are caused by failed lines in a system with a submersible pump. The submersible pump which is commonly used in large installations, can push product out of the tank despite damaged lines, but this is impossible with a suction system.

I am not asking for relaxation of construction materials or methods, but I am hopeful that you won't require lined trenches or monitoring systems in those cases where small tanks are used in conjunction with suction pumps.

(There is precedent for this in Air Quality Management regulations. They exempt smaller facilities, based upon monthly throughput, from vapor recovery nozzle requirements. They also exempt agricultural tanks - just as you do).

[redacted]

MAY 10 1984
DIVISION OF
[redacted]

4333 Pacheco Boulevard • Martinez, California 94553

(415) 228-2222 Martinez | (415) 634-3013 Brentwood | (707) 553-9127 Vallejo | (415) 447-2815 Livermore

IRB

Although the total amount of fuel in these smaller facilities is an insignificant percentage of the total stored throughout California, it is a significant percentage of the volume of a typical non-retail jobber.

I hope you will give this request your serious consideration. If you believe greater clarification is necessary, please give me the opportunity to discuss it further with you, your colleagues, or your staff.

Sincerely,

Richard H. Fahey

Richard H. Fahey

TB13

10. To Manager Underground Container Program, SWRCB; From Darrell Heppner; April 25, 1984; Subject: Insurance for Owners of Underground Tank Containers

DARRELL HEPPNER
INSURANCE BROKER
154 Sunnyside Dr., San Leandro, Ca 94577 • (415) 632-2200 • (415) 632-5550

April 25, 1984

Manager
Underground Containers PROGRAM
SWRCB
P.O. BOX 100
Sacramento, Ca. 95801-0100

Hi,

We have read your materials concerning registration of all tanks, sumps, pits, ponds and lagoons by July 1.

~~Is~~ are there any requirements by the State for insurance to indemnify the owners of these underground containers if one should accidentally or gradually cause (allegedly) bodily injury or property damage?

Would the companies registering their undergound containers desire such coverage?

We have specialized in parallel group programs for public agencies since 1976. Perhaps a model program could be offered through your Board.

If there is a need or interest, we will be in Sacramento several times next month and I would welcome the opportunity to pursue these ideas.

Sincerely,

Darrell Heppner

11. To Michael A. Campos; From SDL Hayson, Insidious Leakage Alert; April 26, 1984; Subject: The VESTAL HELIX SOLUTION to a Leak Detection Device) includes Diagram - Pollution Preventing Manhole

MAY 8 1984

Mig - DTS
Please handle as appropriate.

VESTAL HELIX

April 26, 1984

Dear Mike,

INSIDIOUS GROUNDWATER CONTAMINATION

Recent evidence suggests that one of the most serious threat to groundwater is the so-called insidious leakage around underground tanks. This is the small but regular leakage that occurs every day as an underground petroleum tank is filled, dipped for measurement, bilged , and so on.

Each small incident is deceptively trifling, compared to the major leaks that make headlines. But the cumulative effect on community groundwater can be devastating, and mysteriously difficult to trace and correct. For example, a half gallon overfill could be enough to pollute the groundwater of 25 000 residents.

In certain areas particularly where there is now only one acquifer left for water supply, protection against this kind of leakage has been mandated. Various advanced states are now preparing similar measures and protective guidelines.

CURRENT OPTIONS

What is needed is a device that will contain or prevent all spills of this kind, no matter how minor, but which is economical and easily serviceable in the case of such a spill. The device must be retrofittable to the vast number of already installed tanks.

1. MAJOR INSTALLATIONS

The first class of solutions comprises significant structural or electromechanical modifications that will stop overfill by automatically cutting off the supply of petroleum (or other toxic material), or by rerouting the spill to an auxiliary tank.

Problem: Firstly, these devices are directed only to the major overfill spillage, not to all the other causes of leakage. Secondly the retrofit cost is in the region of $4000 per tank or higher.

MAY 9 1984
DIVISION OF
WATER SERVICES

VESTAL HELIX CO • BOX 54, R.D. 2 • BLOOMS CORNERS ROAD • WARWICK, N Y 10990 • (914) 986-7682 • TELEX 3768568-CADNYK

2. CONTAINMENT AROUND THE PIPE:

The most common recommendation is to use imbiber beads. There are three solutions here:

(i) First, to throw loose imbiber beads around the fill line. These beads absorb hydrocarbons and swell to 16 times their normal size. The problem here is that the seal against all leakage is imperfect, the cost of replacing all these beads after a leak is be exorbitant, and the hygiene involved in allowing a compacted, petroleum-soaked mess to develop is suspect. Disposal of such a large mass of contaminant is also a problem. The method is sloppy, and to the best of our knowledge is not currently recommended.

(ii)Second, to use the above method, but have the beads contained in a filter cloth bag tied about the manhole. In this way, when the spill soaks the beads the entire mass can be removed and an entirely new bag put in it's place. Problem: This is an improvement on the previous method, but in our opinion the tied seal will not contain all insidious spillage, and the problems of disposal, replacement cost, and hygiene remain.

(iii)The third method is the Vestal Helix PPM-x solution.

THE VESTAL HELIX SOLUTION

Briefly, this device is a state-of-the-art plasticized basin which is placed in the fill pipe manhole and carefully sealed against all surfaces of the manhole and fill pipe. This basin can therefore contain all spillage. At the bottom of this basin is an easily replaceable cartridge (Aquapaq) filled with imbiber beads, and acting as a valve. Rain water will flow through this valve.

A minor petroleum spill of less than 40cc will simply sit on the bottom of the basin and evaporate. A more major spill will drain into the cartridge, be absorbed into the imbiber beads and cause them to swell. This will shut off the flow.

Once the cartridge has been saturated, it can be removed from the basin and replaced at minor cost. If there is fuel in the manhole it can easily be syringed back into the main tank, before removing the cartridge.

A detailed drawing is attached.

REACTION TO DATE

To date this device has been included in leading county and state guidelines and recommendations. The reason appears to focus on its robustness, economy (the device costs an installer $185.00 with $8.70 per Aquapaq cartridge), ease of retrofit (one hour), convenience of replacement, and soundness of seal.

One happy byproduct is to reduce the mystifying number of false alarms emitted by tank leak detection systems. Many of these are caused by unknown insidious leakage. This results in unecessary excavation of a tank which is really sound, causing antagonism to the program. The PPM-x device will stop this.

WHAT YOU CAN DO

You can do two things.

1. Mandate protection against insidious leakage of this kind, by recommending imbiber bead protection of the kind described above.

2. Alert the various persons responsible, especially those in charge of tanks, of the dangers of insidious spillage.

Please call me collect with any queries you may have, or with any assistance you might need to put the above steps into effect.

Sincerely,

Simon Haysom

SDL Haysom
Insidious Leakage Alert

Michael Campos
Executive Officer
P.O. Box 100
Sacramento, California 05891

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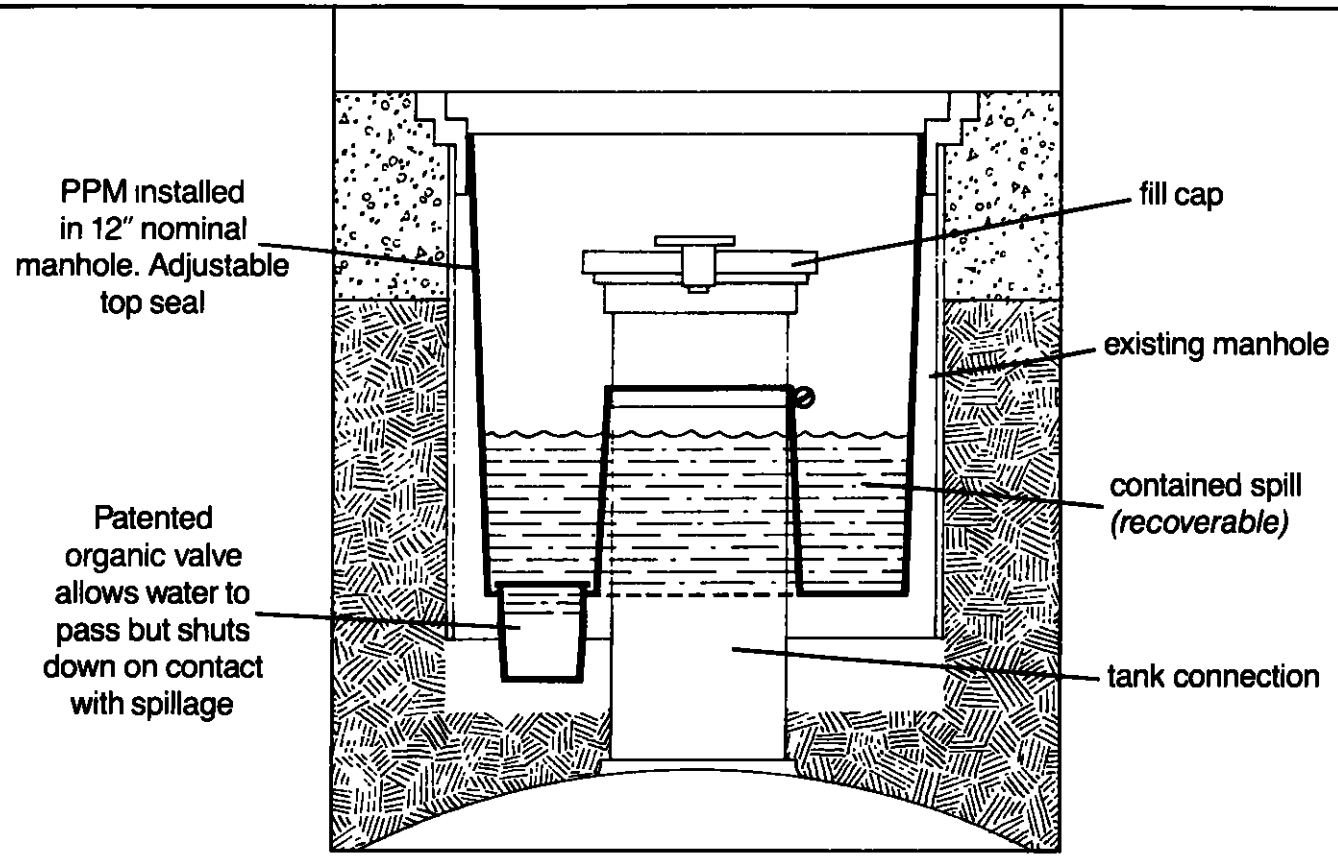
(patent pending)

- *PROTECTS COMMUNITY GROUNDWATER AGAINST PETROLEUM SPILLAGE AT CONNECTIONS TO UNDERGROUND TANKS*
- *MINIMUM COST*
- *RETROFITTABLE • SIMPLE TO INSTALL*
- *EASY TO MAINTAIN AND CONTROL*



- *PASSES WATER DURING NORMAL CLEAN OPERATION*
- *PREVENTS FALSE ALARM BY TANK LEAK DETECTION SYSTEMS*
- *CONFORMS TO GROUNDWATER AUTHORITY RECOMMENDATIONS AND CURRENT ADVANCED LEGISLATION*

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12. To Clint Whitney; From Richard Roberts, County of San Bernardino Environmental Health Services; May 20, 1984; Subject: Suggests Workshops throughout State

6-13 Orig. WGP
✓ Copies: Board

ENVIRONMENTAL HEALTH SERVICES

COUNTY OF SAN BERNARDINO
ENVIRONMENTAL
PUBLIC WORKS AGENCY

☒ North Arrowhead Avenue · San Bernardino, CA 92415-0160 · (714) 383-1617
☐ 320 East "D" Street · Ontario, CA 91764 · (714) 988-1324
☐ 15579 Eighth Street · Victorville, CA 92392 · (714) 245-3216
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KENNETH C. TOPPING
Deputy Administrator
Community Development

RICHARD L. ROBERTS, R.S., M.P.H.
Director

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Grand Terrace	*Upland*
Loma Linda	*Victorville*
Montclair	

~~1-ECA~~
~~2-RG~~
3-HS

May 20, 1984

Clint Whitney, Executive Director
State Water Resources Control Board
P. O. Box 100
Sacramento, CA 95801

Shorter Underground Tank Program

Dear Mr. Whitney:

The quality of the AB 1362 regulations currently in development will be enhanced through public input. In the past, hearings held in Sacramento have been minimally effective in eliciting grass roots input. I suggest that improved input, as well as greater acceptance and understanding of the new regulations, will be had through the sponsoring of three or four workshops throughout the state by your agency.

I appreciate your efforts in developing realistic, yet effective, regulations.

Sincerely,

Richard L. Roberts

RICHARD L. ROBERTS, R.S., MPH
Director

RLR:ep

bcc: Don Koepp
Greg Carmichael
Tim Kelly
Harold Singer
Ken Willis

JUN 15 1984

13. To Harold Singer; From Bryant C. Donner, Lathain and Watkins; May 21, 1984; Subject: Participation in May 15th Workshops includes List of Questions Submitted at Workshop

V. E. 13.

LATHAM & WATKINS

ATTORNEYS AT LAW
555 SOUTH FLOWER STREET
LOS ANGELES, CALIFORNIA 90071-2466
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NEWPORT BEACH, CALIFORNIA 92660
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701 "B" STREET, SUITE 2100
SAN DIEGO, CALIFORNIA 92101-8197
TELEPHONE (619) 236-1234
TELECOPIER (619) 696-8281

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1333 NEW HAMPSHIRE AVE., N W, SUITE 1200
WASHINGTON, D C 20036-1594
TELEPHONE (202) 828-4400
TELECOPIER (202) 828-4415
TWX 710 822-9375

May 21, 1984

CALIFORNIA REGIONAL WATER
MAY 23 1984
QUALITY CONTROL BOARD

Mr. Harold Singer
San Francisco Bay Regional Water
Quality Control Board
1111 Jackson Street
Room 6040
Oakland, California 94607

Dear Harold:

Thank you very much for participating in our May 15 workshop on underground tanks. I particularly appreciated the fact that you were well-prepared and candid in dealing with the difficult issues raised by the new regulatory systems.

For your information, I am enclosing a compilation of all the questions which were submitted in writing before and at the workshop, arranged generally by subject matter.

Thanks again for your help.

Very truly yours,

Bryant C. Danner
of LATHAM & WATKINS

Enclosure

Los Angeles Area Chamber of Commerce
May 15, 1984 Workshop on Underground Tanks --
Leak Detection and the Regulatory Maze

Questions Submitted In Advance

(The following is an unedited compilation of the questions that were submitted in advance or at the workshop.)

A. General Questions Regarding Coverage of the Underground Tank Rules:

1. What is the definition of an underground tank which requires monitoring for leaks under:
   a. The RWQCB requirements,
   b. The Los Angeles County requirements,
   c. The Los Angeles City requirements,
   d. The County of Ventura requirements, and
   e. The Sher Bill?

2. What is the status on the generation of a list of hazardous materials that is to be established by the California Department of Health Services?

3. What definition of an underground tank is applicable to the Cortese Bill?

4. What is the difference between underground storage tanks and partially buried process tanks, as it relates to the Sher and Cortese bills and to the Water Quality Board regulations?

5. What are the requirements for the various fuels: gasoline, diesel, aviation, and jet?

6. Are underground structures containing hazardous substances which are part of an ongoing process regulated by the Sher Bill? If not, is a workable definition of "process" available?

7. What is the definition of underground storage tanks?

8. Is a wastewater sump included in the underground tank definition?

9. Are spill containment pits included in the underground tank definition?

10. Are #2 and #6 crude oil, used in industrial boilers, stored in underground storage tanks exempt from registration and obtaining a permit from city or county? NOTE: Cal. Health & Safety Code 25317 exempts petroleum, including crude oil or any fraction thereof as being a hazardous substance.

11. Do acid neutralizing tanks fall into the category of "underground" storage tanks? Will they require monitoring?

12. How will 55 gallon drums of hazardous waste (95% segregated by chemical type) stored above ground (temporarily) be treated?

B. <u>Leak Detection Program</u>:

1. What is the approval procedure for proposing a leak detection system which is different from the RWQCB recommended standards?

2. The RWQCB has requested 80 tank owners to leak test their tanks. How many owners have responded to this request, how many leaking tanks were found, and what was the most common means of leak detection?

3. When will the RWQCB issue additional requests to tank owners to determine if their tanks are leaking?

4. Does the City of Los Angeles Ordinance still require monitoring of underground tanks by July 1, 1984?

5. Is there any chance that the January 1, 1985 deadline date will be extended?

6. Is it advisable to take site specific groundwater samples to establish a baseline for groundwater monitoring?

7. What assurances do we have that leak testing will be carried on in an honest and accurate manner?

8. How can industry help the RWQCB to effectively enforce the new leak detection regulations? (If there are a few businesses which evade the regulations, industry in general can suffer from the actions of a small minority.)

8. What effects will be felt by owners of an existing underground gasoline storage tank?

9. Are regular (monthly) visual internal inspections of underground containers, specifically sumps, an acceptable monitoring alternative?

10. To what extent will the contractor be required to excavate to determine the limits of a leak?

11. When testing to determine if an existing tank has leaked, how detailed are the tests to be and what is the limit of a toxic level. Also, do different types of material have different levels of toxicity?

12. What is the current "state-of-the-art" method(s) for monitoring underground storage tanks?

13. Who are the top consultants for design and installation of monitoring systems? (Civil Engineer vs. Geologist) Hydrologists?

14. Has any experience with "slant drilling" of monitoring wells of service stations been accumulated?

15. Discuss groundwater and Vadose Zone monitoring requirements.

16. Regarding the Board's leak detection program:

    a. Flexibility on slant drilling?

    b. Flexibility on installation of monitoring devices other than wells in the unsaturated zone?

    c. How have cases that have already come before the board been handled? What were problem areas?

d. What is current review time (how long from work plan submittal to start of work?

C. Relationship Among Various Regulatory Programs:

1. What role will the Regional Board play:
   a. Currently, with regard to the local tank ordinances and
   b. In the future when the local regulations and procedures are established?

2. How can tank owners be assured that the leak detection required by the RWQCB will meet the requirements of the local ordinances?
   a. What is the level of integration among the RWQCB requirements and the several local ordinances?

3. Who does industry need to talk to today if a new tank is to be installed or an old tank removed or abandoned?
   a. County Fire Department?
   b. RWQCB?
   c. DOHS?
   d. County Engineer?
   e. County Health?
   f. City Attorney?
   g. State Board?

4. Will the City or County recommend methods for underground tank monitoring?

5. Will DOHS, RWQCB, or local agencies publish "cookbook" style regulations for tank owners to follow in order to comply with the Sher Bill requirements?

6. How do the RWQCB regulations relate to other local ordinances, also how do the (e.g.) L. A. County Ordinance relate to the City of Torrance Ordinance.

7. What are the requirements on Federal jobs where local authorities may not have jurisdiction?

8. A plan for leak detection was previously submitted to the L.A. Region. Because of higher priorities, it has not yet been approved. When it is, can we be sure that it will meet the State requirements?

9. My company is located in the San Fernando Valley. If I comply with the Regional Water Quality Control Board's Testing and Reporting Requirements for the current Underground Tank Leak Detection Program, will I also satisfy the "Cortese", "Sher" and L.A. County requirements and if not -- why?

10. Who is the inspecting authority and what is the relationship between the State Regional Water Quality Control Board, the L.A. City F.D., the Building Department and the Air Pollution Control Authorities?

11. Is any one preparing a list of who the different authorities are in different areas. L.A. City, L.A. County, City of Beverly Hills, etc.?

12. What type of monitoring program for existing sites will be implemented by the State Water Quality Control Board?

13. Will L.A. County and/or L.A. City adopt the State's regulations?

14. What is the outlook for uniform statewide guidelines, procedures, methods and levels?

15. Los Angeles City Ordinance No. 158585 requires that the owner of a hazardous substance storage facility file an application for a permit by 6/23/84. The owner cannot properly evaluate options until state guidelines are available. Has the City voiced any intention to rescind the 6/23/84 deadline?

16. When will the state's regulations be ready for review?

D. "Cortese Bill" - Registration Procedures

1. Has the State Board adopted an inventory form to be completed by tank owners? If so, how does a person obtain copies? If not, when can it be expected?

2. How will industry receive the forms to be issued by the State to inventory underground tanks? Also, when? I heard they were being mailed out but have not yet received same and the State was advised of the need.

3. In registering a hazardous waste sump which may contain a large number of components, are continuation sheets available or could a characterization be attached in lieu of Section VIII - Chemical Composition section of the official registration form?

4. If a firm fails to submit its registration forms by July 1, 1984 will the firm be fined effective July 2, 1984?

E. Tank Abandonment Construction and Retrofit:

1. What are the requirements for abandoning underground tanks in place?

2. How is the Regional Water Quality Board dealing with underground tanks which are no longer in use?

3. How is industry approaching their abandoned underground tanks?

4. What are the requirements for getting rid of old tanks?

5. What licenses are required to remove old tanks and, in event of a leak, the contaminated materials?

6. Will containments for above ground storage require membrane barriers?

7. What requirements will there be for existing buried lines? Modifications?

8. What are the requirements, and methods, for retrofitting existing installations?

9. What licenses are required to install the new double wall tanks and monitoring systems?

10. What type of construction specifications will be developed regarding underground motor vehicle storage at new facilities? (By State W.Q.C.B.)

11. Do former site locations of storage tanks (now removed and filled in) require "closure action" on the part of the generator? (i.e.: soil sample, monitoring, etc.) What is the liability?

12. If an underground tank is removed prior to the July 1, 1984 deadline for registration, are there any requirements (such as that the soil beneath the tank be tested for contamination)?

F. Clean-Up Responsibility and Criteria:

1. What is required if a gasoline tank is found to have leaked material at some point in its service life?

2. How does risk assessment figure into the determination of what is "clean"?

3. In general, what is the loss percentage of all gasoline delivered?

4. What percentage of this is recovered?

5. How many groundwater sources have been lost so far?

6. How many may be jeopardized?

7. What are the requirements for getting rid of contaminated dirt?

8. What are the guidelines for clean up, in the event of leaking tanks?

9. (a) Are there minimum levels established for contaminants found during testing and/or monitoring?

(b) Is the minimum contaminant level the same in soil as in water?

(c) Has a standardized test method been developed for analysis? Soil samples cannot be treated the same as water samples.

14. To SWRCB; From John McCullough, Frank B. Hall and Company; June 1, 1984; Subject: Questions Regarding insurance for Underground Tank Regulations

Frank B. Hall & Co. of California
Northern Division
6150 Canoga Avenue, Suite 111
Woodland Hills, California 91367

June 1, 1984

Water Resources Control Board
P.O. Box 100
Sacramento, CA 95801-0100

RE: Underground Storage of Hazardous Materials

Gentlemen:

Frank B. Hall & Co. is a Managing General Agency which writes insurance for a large number of automobile dealerships and oil jobbers in the State of California. The main types of hazardous liquids that they store underground are gasolines, diesel fuels and waste oil from oil changes.

After reading some new regulations on the underground storage of hazardous materials, I have the following questions:

(1) Is the storage of gasoline, diesel fuels & waste oil covered under the new Sher law?

(2) Is there an exception for volume capacity (small quantity) underground containers?

(3) Are there certain variances in the law concerning motor fuel storage monitoring where ground water is below 30 ft.?

(4) If underground motor fuel storage has not been used for some time, are there requirements to be followed such as monitoring and filling the substructure?

(5) Can a facility avoid monitoring,etc., by draining & stopping to use an underground fuel storage tank now?

Telephone (213) 992-8601

Established in 1862

(6) Where an existing tank is to be replaced with a new tank with secondary containment, what monitoring systems need to be installed on the new tank?

(7) For existing underground storage tanks of motor fuels, is monitoring needed beyond daily gauging & inventory reconciliation?

yes

(8) If monitoring "wells" are needed, at what time intervals is testing needed (i.e., quarterly, annually, etc.)?

detection - weekly
verification - semi-annually

(9) If monitoring wells are needed for existing underground storage tanks of motor fuels, is the due date 1/1/85?

(10) What means were you able to use to identify the owners or operators of facilities which had underground storage containers (did you contact all major oil company distributors & independent oil jobbers?) to inform the people that they had to fill out the hazardous substance storage statement?

If you have any background information pertaining to the numbers of tanks estimated in California, and the estimated number of tanks which are leaking, I would appreciate that and any other information that you have available on the subject.

Sincerely,

John R. McCullough

John R. McCullough, CSP
Loss Control & Engineering Manager

JRM:rg

15. To Edward C. Anton, From Rex H. Black, Owner, Valley Leak Detection Service; June 8, 1984; Subject: Requests Opportunity to Provide Input into the UGT Regulations

A

I

~~1.RG~~
~~2.MS~~
3. Linda

response for my signature Rex

VALLEY LEAK DETECTION SERVICE
31848-D Road 138-Visalia, CA 93291
(209) 734-0225

June 8, 1984

State Water Resources Control Board
Division Of Technical Services
P.O. Box 100
Sacramento, Calif. 95801
(916) 322-3133

Attention Mr. Edward Anton:

Our company is in the business of providing leakage surveys for operators of pipelines carrying hydrocarbon fluids and gases. The methods and equipment is applicable to storage tank leak detection.

If possible, we would like to have some input regarding the development of the guidelines to implement AB 1362 (Sher) and would like a copy of the Draft now being circulated for comment.

We believe it should be possible to monitor existing tanks for leakage using vapor wells and a flame ionization detector. This method would be relatively inexpensive, about $1,000.00/well site and $150.00 for an annual leak check, but still insure ground water protection when done in conjunction with the inventory analysis.

It is sincerely hoped that you will allow for our participation here in developing guidelines which are effective and affordable.

Very truly yours,

Rex H. Black

Rex H. Black, Owner

Thank you for your letter of June 8 requesting an opportunity to provide input to the underground tank regulations.

JUN 12 1984

We will send you a copy of the draft regulations as soon as they are available and have added your name to the mailing list.

If you have questions please call Kathy Hardcastle-

VALLEY LEAK
DETECTION SERVICE
31848-D Road 138-Visalia, CA 93291

PM
8 JUN
93726

USA 20¢

Edward Anton
Chief-Div. Technical Services
State Water Resources Control Board
P.O. Box 100
Sacramento, Ca. 95801

16. To Carole A. Onorato; From Assembly Person Byron Sher; June 11, 1984; Subject: Questions about Monitoring Requirements

June 15, 1984-Original-SABradfield
cc'd: Board
MAC
WGP
WRA

CAPITOL OFFICE
STATE CAPITOL
SACRAMENTO, CA 95814
(916) 445-7532

DISTRICT OFFICE
735 CASTRO STREET
SUITE C
MOUNTAIN VIEW, CA 94041
(415) 961-6031

ADMINISTRATIVE ASSISTANT
BETSY BLAIS

Assembly California Legislature

BYRON D. SHER
ASSEMBLYMAN, TWENTY-FIRST DISTRICT

COMMITTEES

CHAIRMAN,
CRIMINAL LAW AND
PUBLIC SAFETY

NATURAL RESOURCES
TRANSPORTATION
JOINT LEGISLATIVE
COMMITTEE ON
PRISONS (VICE-CHAIRMAN)

(1) OK
(2) Richard Sher
(3) Legal
(4) file - 1362

June 11, 1984

Carol Onorato, Chairwoman
Water Resources Control Board
901 P Street
Sacramento, Ca 95814

Dear Carol:

I understand that some question has arisen over the monitoring requirements for underground storage tanks containing motor vehicle fuels established under my Assembly Bill 1362 (Ch. 1046, Stats. 1983). I would like to clarify the intent of the language in AB 1362 which addresses this issue.

Section 25284.1 generally concerns itself with the monitoring of "existing tanks"; that is, tanks which were placed in the ground on or before January 1, 1984. Subdivision (a) of this section requires that on or before January 1, 1985, each tank be outfitted with a monitoring system capable of detecting unauthorized releases, and that thereafter the tank be monitored accordingly. Subdivision (b) states that visual inspection of the tank, where practical, shall be performed as a means of meeting the requirement for monitoring set forth in subdivision (a), thus establishing it as the preferred means of monitoring. Subdivision (b) also states that alternative methods of monitoring on a monthly or more frequent basis may be required by the local regulating agency pursuant to regulations promulgated by the SWRCB. Subdivision (b) then enumerates some (but not all) of the alternatives which may be required in lieu of visual inspection.

One of the monitoring alternatives provided under subdivision (b), which is applicable only to tanks containing motor vehicle fuels, is the use of daily gauging and inventory reconciliation by the tank operator, provided that (1) the inventory records are kept on file for one year and are reviewed quarterly, and (2) the tank is tested pursuant to regulations issued by the SWRCB. It should be noted that the above requirement is only one of several which may be specified by the local agency and is not the sole monitoring method which the local agency may require of operators of underground motor vehicle fuel storage tanks.

A

I hope the foregoing elucidates the intent of Section 25284.1 of the law. If you have any questions regarding this matter, please feel free to contact me.

Sincerely,

BYRON D. SHER
Assemblyman, 21st District

BDS:jm

17. To Kathy Keber; From Lenny E. Walker; June 13, 1984; Subject: Definition of "Farm" as Contained in AB 1362

California Association Of Nurserymen

1419 21st STREET, SACRAMENTO, CA 95814, (916) 448-2881

June 13, 1984

Cathy Keeber
State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95801-0100

Subsequent to our phone conversations regarding the registration and regulation of the underground storage of hazardous substances and waste, this letter is to confirm the understanding we reached regarding the definition of "farms" as contained in AB 1362.

According to the California Agricultural Code, the term "farm" is referenced in section 52262. The original intent of this definition is correctly stated in AB 2298 by Assemblyman Condit which amends section 52262 to read:

> "farm means a place of agricultural production which has annual sales of agricultural products of $1,000 or more"

The term "agricultural products" is defined in section 54004 and includes any horticultural product (also section 55403 - Def. Farm Product).

On the assumption that AB 2298 will continue to proceed through the legislature and become law, nurseries would fall under the definition of farms as stated in AB 1362. This determination would exempt from regulation fuel tanks located on nurseries that store fuel for nursery vehicles. The effective date for registration of nursery fuel vehicle tanks is October 1, 1984. Nevertheless, it is the opinion of this Association and the California Department of Food and Agriculture that nursery operations are indeed an aspect of farming and agriculture and that any such definition should include horticulture.

From our conversation it is also my understanding that the necessary individuals would be so notified so as to effectively implement this decision. Should this not be in accordance with your recollection, please advise.

Sincerely,

Lanny E. Walker
Legislative Director

LEW:sg

18. To SWRCB; From Bill DeBord, J.E. DeWitt, Inc.; August 10, 1984; Subject: Interest in Knowing if Leak Tracer Dye Meets Detection Requirements includes Article on Tracer Dye

GOOD REGULATIONS PUT ON 96 LIST

T. E. 15

AUG 20 1984

Tom Ricka

J. E. DeWitt, Inc.

P.O. BOX 3867
SO. EL MONTE, CA 91733-0867
(818) 444-2691 (213) 283-8123

August 10, 1984

Water Resources Control Board
P. O. Box 100
Sacramento, Ca. 95801-0100

Gentlemen:

Re leak detecting monitors, please find enclosed a copy of an article from the Petroleum Marketer.

I am interested in finding out if this leak detector dye would meet your requirements.

Thank you in advance for an answer to this question or any information you have concerning leak detecting devises.

Sincerely,

Bill DeBord

Bill DeBord
Maintenance Manager

BD/sm
enc.

X

E2

AD 53

Activates Only In Hydrocarbons

Leak Detector Dyes Prevent Product Loss

Mason Lankford and his Leak Tracer Dye. Photo courtesy of the Fort Worth Star-Telegram.

Mason Lankford had seen the problem of leaking underground petroleum storage tanks before. "We had many of these occurrences while I was fire marshal throughout the county (Tarrant County, TX.), both in the incorporated cities and in the rural areas," he said. Later, as a consultant he asked other fire officials what they felt could be done to help alleviate the problem. The answer given was early detection.

Lankford and two chemists, Chris Rice and Glen White, got together and discussed the problem. The answer they came up with was a dye. Called Leak Tracer Dye (LTD), it is a synthetic formula and the carrier is biodegradable.

But the important thing is that only hydrocarbon products will activate this dye. Water has no effect on it, Lankford explained.

One method of using the dye is to spread it evenly in the backfill around new tanks as they are installed. Another is to install a series of four-inch-wide, 12-foot-long plastic tubing columns vertically at specific locations around the tanks.

In the second method, about 16 pounds of the dye is placed in a fiberglass fabric bag and inserted in the bottom of the riser, one bag per riser. The risers are perforated to allow liquids to enter, and more fiberglass fabric is tied around the perforations to keep dirt and debris out. As water enters the risers, no effect is noticed, but at the first sign of hydrocarbons, the water in the sump and the bag will take on the color of the dye.

Every day, the bag is hauled out and inspected and each vertical tube can be sticked.

But many times attendants do not perform functions they are told to do. Just as they often neglect to stick a tank, they may neglect to check the Leak Tracer Dye. Should product be discovered elsewhere, the dye will indicate the probable source of the leak.

"We can detect this dye down to about 1½ parts per million, and you can see it at about four parts per million in color," he said. Currently, the product is available in four colors; red, blue, a light green and purple. "Those colors were picked because of their ease of identification under a spectrometer," Lankford explained. He speculates there may be as many as nine colors in the future. □

Leak Tracer Dye will not activate in water. Checking a bag of dye on a daily basis will indicate if a leak is present. Photo courtesy of the Fort Worth Star-Telegram.

SURNAME

19. To Mr. Armstrong, Fire Services Division, Sunnyvale, forwarded to SWRCB for response; From John T. O'Halloran, General Manager, Santa Clara Valley Water District; Subject: Concerns of the Sher Bill Preempting County's Hazardous Material Storage Ordinance

I.E.H. RJ MF

Santa Clara Valley Water District

5750 ALMADEN EXPRESSWAY
SAN JOSE, CALIFORNIA 95118
TELEPHONE (408) 265-2600

August 22, 1984

Mike - If there is anything in here we disagree with we should respond - RJ

Mr. Von Armstrong, Commander
Fire Services Division
City of Sunnyvale
Post Office Box 60607
Sunnyvale, California 94088

Dear Mr. Armstrong:

In response to your questions regarding the recently released draft regulations proposed by the State Water Resources Control Board for implementation of the Sher Bill, we have reviewed the relevant sections of the Sher Bill. Consequently, we feel certain that the Sher Bill was not intended to preempt ordinances adopted by local jurisdictions prior to January 1, 1984, such as Santa Clara County's Hazardous Materials Storage Ordinance.

The Sher Bill specifically states, in Section 25288, that "any city, county or city and county which prior to January 1, 1984, has adopted an ordinance which, at a minimum meets the requirements set forth in Section 25284 and 25284.1...is exempt from the provisions" of this bill. The other sections referred to set forth the requirements of double containment for tanks installed after January 1, 1984 and groundwater monitoring systems for all existing underground tanks, similar to the requirements of the locally adopted ordinances. Therefore, since the Sher Bill does not apply in jurisdictions that have adopted a local ordinance, as the county and most of the cities have done in Santa Clara County, those jurisdictions need not be concerned with the possibility of having to enforce the draft regulations recently proposed by the State Board. The guidelines developed by the Santa Clara Valley Water District may continue to be used by the cities for implementation of the local ordinances even after the State regulations for the Sher Bill have been adopted.

However, I have attached for your information, a copy of the draft regulations recently proposed by the State Board. Note that this copy was received informally by the District and may not be the most current draft version.

I appreciate your bringing this problem to my attention and encourage you to contact Dave Chesterman, of my staff, if you have any further questions regarding the Sher Bill's applicability to this county.

Sincerely,

John L. O'Halloran
General Manager

Attachment
cc: See list of names attached

A

cc: State Water Resources Control Board
P. O. Box 100
Sacramento, CA 95801

Regional Water Quality Control Board, Region #2
1111 Jackson Street, Room 6040
Oakland, CA 94607

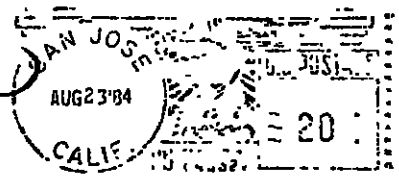
Tom Lewcock, City Manager
City of Sunnyvale
P. O. Box 60607
Sunnyvale, California 94088

Jess Barba, Director of Public Safety
City of Sunnyvale
P. O. Box 60607
Sunnyvale, CA 94088

JTO:scs

Santa Clara Valley Water District
5750 ALMADEN EXPRESSWAY
SAN JOSE, CALIFORNIA 95118

Dir. 7
Tech. Services
4 - Flow



State Water Resources Control Board
P. O. Box 100
Sacramento, CA 95801

20. To Harold Singer; From James Hartley; August 24,1984; Subject: Presentation Given at Seminar

I.C.20 HJS

3467 Kurtz Street
San Diego, California 92110
(619) 224-2911

Woodward-Clyde Consultants

August 24, 1984
Reference No. 540712

Mr. Harold J. Singer
Regional Water Quality Control Board
1111 Jackson Street, Room 6040
Oakland, California 94607

Dear Harold:

Thank you again for giving such an informative, well-organized presentation of the Sher Bill and the requirements of the Draft Regulations at our seminar last Tuesday. We received compliments from several of the attendees on the quality of the speakers, and I'm confident that your presentation was a major reason for this positive response.

By the end of next week, I hope to have copies made of the slides you requested for your use. You should receive them within two weeks; if by then they haven't shown up, please let me know so that I can track them down.

It was a pleasure meeting you this week, and very enjoyable to have shared the speaker's podium with you. On behalf on Woodward-Clyde Consultants, I'd like to congratulate you on what I believe was an effective public education seminar for the San Diego area.

Very truly yours,

WOODWARD-CLYDE CONSULTANTS

James D. Hartley

James D. Hartley
Assistant Project Engineer

cc: Ed Anton, State Water Resources Control Board

21. To California Department of Water Resources; From Barbara J. Peters; August 31, 1984; Subject: Inquiring about Investigation into the Problem of Gasoline Leakage from Underground Tanks

V, E. 21,
A36

Law Offices
PETERS & PETERS
ATTORNEYS AND COUNSELORS AT LAW
1460 FOURTH STREET, SUITE 302
SANTA MONICA, CALIFORNIA 90401
(213) 395-7117

GEORGE A. PETERS
BARBARA J. PETERS

31 August 1984

California Department of Water Resources
1416 Ninth Street
Sacramento, California 95814

Gentlepersons:

Have your offices done any investigation into the problem of gasoline leakage from underground storage tanks? If so, please advise if I may and how I may obtain copies of your reports.

Thank you for your courtesy and cooperation.

Sincerely,

Barbara J. Peters

BARBARA J. PETERS

BJP/r

To RJ
From MF

9/10/84 - Called Mr. Peters
He is anticipated in receipt
of Oct. 23 hearing on draft regs.
Mr. Peters will call me after
hearing for procedure to get
transcript. I gave him number
+ address of Regional Bd. Trinity

Received
SEP 11 1984

22. To Mitch Dion, President CIOMA; From Tom Robinson, Chairman, Ad Hoc Committee on Underground Tank Regulations; September 5, 1984; Subject:. Concerns Over Interpretations of Existing Tank Monitoring, Section 25284.1(a)

Robinson Oil Company, Inc.

1250 WILLIAMS ROAD ● SAN JOSE CALIFORNIA 95129 ● TELEPHONE (408) 255-9511

September 5, 1984

Les A. Cohen & Assoc.

SEP 10 1984

RECEIVED SEP 7 1984

Mr. Mitch Dion
President
California Independent Oil Marketers Association
1569 West 16th Street
Long Beach, CA 90813

Dear Mitch:

As a member of the CIOMA Ad Hoc Committee on Underground Storage Tank Regulations you are well aware of the tremendous potential costs CIOMA members and their customers will incur upon implementation of the regulations currently being developed by the California State Water Resources Board and by the various cities and counties which are instituting their own tank regulations.

Last week the Water Board had a workshop to go over the proposed draft of the regulations with members of the petroleum industry. CIOMA was represented by a number of members on the Ad Hoc Committee. During the workshop our worst fears were confirmed. The Water Board has interpreted the section on monitoring existing tanks, section 25284.1 (a), which reads "On or before January 1, 1985, the owner shall outfit the facility with a monitoring system capable of detecting unauthorized releases of any hazardous substances stored in the facility, and thereafter, the operator shall monitor each facility, based on materials stored and type of monitoring installed." to mean that "...the monitoring system must be capable of detecting active and historic unauthorized releases, any unauthorized release that may occur in the future, and be capable of measuring the ground water quality directly." (Article 4, section 2640 (a)). Originally it was my understanding that the intent of the law with regards to existing tanks was to monitor them for current and future leaks. Based on that interpretation a number of monitoring alternatives were available to choose from. Based on the Water Board's interpretation, not only must the tank be monitored for its current and future condition, but also its past condition and the condition of the ground water below it must be monitored. Now rather than alternative methods of monitoring to choose from, a number of monitoring methods are required. The cost of monitoring has escalated tremendously and consequently may be prohibitively expensive to tank owners.

For the Water Board to make changes in their draft they must have written requests for changes with reasons for those changes. The Ad Hoc Committee will prepare comments on the monitoring requirements for existing tanks as well as comments on a number of other requirements in the draft, but that will not be enough. I believe the Water Board, based on their comments at the workshop, will be willing to make some important changes in the draft, but not on the issue of monitoring existing tanks.

These tank regulations, especially with this stringent interpretation of the monitoring requirements for existing tanks, pose a most serious threat to the economic viability of our membership. It is very important for our industry that we either get more reasonable requirements or at least an implementation time table which will allow us to meet the requirements. I am not sure what we have to do but I know we have to do more than just send comments to the Water Board. Possibly a meeting with all the CIOMA Board of Directors would be in order to discuss our alternatives. It appears we have a few possible approaches. We can approach the author of the bill, Assemblyman Byron Sher, discuss our problems and ask for some relief. Legally the law can be reviewed to see if the Water Boards interpretation of the law is legal. Lastly, we can consider getting expert engineering consultation to determine if there are ways we can live within the existing regulations. If the CIOMA Board met, a strategy to make these tank regulations survivable possibly could be developed.

Let me know your thoughts. These tank regulations are going to have such a tremendous impact on our businesses that I think it is important that we do all we can while we can.

Sincerely,

Tom Robinson
Chairman, Ad Hoc Committee on Underground Storage Tank Regulations

cc Jim Divine, Executive Vice President
Ad Hoc Committee Members:

Gary Rosa	John Wortmann
Mike Walton	John DeWitt, Jr.
Dan Hall	Fred Bertetta, Jr
Gary Nygren	Bert McCormack
Bob Rinehart	Dick Fahay
Ron Ahlport	Chuck O'Connor
Bob Shuster	J. Colin

TR/me

23. To Harold Singer; From Hank Martin, Manager Environmental Quality, California Manufacturers Association; September 12, 1984; Subject: Invitation to Discuss Regulations at Fall Meeting

HJS

California Manufacturers Association

The Hotel Senator Building 1121 L Street, Suite 900 P O Box 1138 Sacramento, CA 95805 (916) 441-5420

September 11, 1984

CALIFORNIA REGIONAL WATER

SEP 12 1984

QUALITY CONTROL BOARD

Mr. Harold Singer
San Francisco Bay Region Water Quality
Control Board
1111 Jackson Street, Room 6040
Oakland CA 94607

Dear Harold:

This is to officially invite you to be a speaker at the upcoming fall meeting of the California Manufacturers Association's Environmental Quality Committee, to be held October 16 and 17 at the Silverado Country Club in Napa, California. As we discussed on the phone, we would appreciate it if you would say a few words on the underground storage tank regulations which will be heard on October 23.

The Environmental Quality committee is primarily comprised of upper and mid level environmental engineers and managers from our member companies. We anticipate an attendance of approximately 80 people.

I have tentatively scheduled you for 3:00 on the afternoon of Tuesday the 16th. I have allowed about 25 minutes for your remarks and anticipate about the same amount of time in questions as those in attendance will be relatively knowledgeable on the subject. If these arrangements are not satisfactory, please let me know so I can rearrange things to fit your schedule. Also, please let me know if you anticipate a need for any audio-visual equipment.

I am looking forward to hearing from you on the subject. With the hearing scheduled for the following week, it should be quite timely.

Sincerely,

HANK MARTIN, Manager
Environmental Quality

HM:ls

707-257-0200
Hwy 121
Atlas Peak Rd

24. To Harold Singer; From Michael J. Bouton, President Genelco Inc., September 20, 1984; Subject: Information on SOIL SENTRY

IV. E. 2

GENELCO, INC.

Mr. Harold Singer
California Regional Water Quality Board
111 Jackson Street
Oakland, CA 94607

September 20, 1984

Dear Harold,

I really appreciated you affording us the time last Monday to review our progress on the Soil Sentry. It was a pleasure meeting you and coming to the realization that we are indeed both on the same side and trying to achieve the same goals.

As you requested, I have enclosed some additional technical information on our Soil Sentry device. As soon as our actual sales brochure is available, I will send you a few copies of it.

We have been looking into the requirements to run the test we talked about and are finding that it could be very expensive. Preliminary estimates indicate about $20,000.00 per sample of soil and since we would like to do 3 or 4 samples, that is approximately $60,000.00 to $80,000.00 in expense. I hope you can realize the significance in that large an expense for a small company such as ours, so we are looking at other alternatives in running that test. If you have any further suggestions on how we can accomplish the testing goal with slightly less expense, we would be most interested in hearing them. I will, however, keep you informed of our progress in the avenues we are investigating so we can share thoughts.

In our discussions with people in the industry, we are finding that there is a relatively good supply of knowledge about the propogation of vapor in different types of soils. We are undertaking a literature search right now to see what is available and will make you aware of that as soon as we have it.

A

11649 Chairman Drive, Suite 16 • Dallas, Texas 75243 • (214) 341-8410
Telex 4992566

Again, I appreciate your support for our approach in our product. I hope you appreciate that we are desirous of wringing this device out, as it were, and proving its capabilities. We wish it to be the finest product on the marketplace to accomplish what it was designed for. I look forward to our next meeting.

Best personal regards,
GENELCO, INC.

Michael J. Bouton
President

MJB/ecb

cc: Reinhard Hanselka
Chuck Rowley

enclosures

SOIL SENTRY
GENERAL DESCRIPTION

Soil Sentry is a vapor sensor monitoring system that automatically tests up to twelve underground test points for the presence of telltale hydrocarbon vapors that would signal a leak in a storage vessel.

The complete system consists of a single self-contained function module - typically located in an onsite office orservice building - and a series of small diameter monitoring tubes routed to the underground test points.

An aspirator in the function module draws air samples from each test point three times daily and compares the samples with a quantity of fresh air drawn from the atmosphere at the time the test is conducted.

If an unacceptable hydrocarbon level is found at any of the underground test points in three successive samplings, both audio and visual alarms are activated to alert on-site personnel.

In addition, an internal printer provides a written record of the times and dates of all alarms as well as other data relating to the operation of the monitoring system.

The design includes sophisticated security features to prevent tampering with the recorded data or system components.

####

SOIL SENTRY
TECHNICAL DESCRIPTION

Soil Sentry is a hydrocarbon sensing vapor monitoring system.

Its basic componentry consists of a bulk semiconductor, a vapor sensor, an aspirator pump, transport tubes, an alarm system, a thermal printer, and a master microprocessor.

The system monitors sub-surface hydrocarbon emissions by drawing samples of air from up to twelve test points through transport tubes and into an explosion-proof sensing cavity. Once inside the cavity, the air samples are tested by the bulk semiconductor to determine the level of hydrocarbons present as compared to the level of hydrocarbons observed in a control sample of air taken at the time of the test.

All active components are located in the function module which is designed for installation in an indoor location.

The module contains a total of thirteen access ports routed through a manifold and using solenoid valves for control.

Twelve of the ports can be used for monitoring purposes. The thirteenth provides control samples of air taken from a location away from the vessels being monitored.

Small diameter plastic tubes are attached to the ports and routed to the remote points to be monitored. In typical installations, inexpensive wells are drilled around the perimeter of underground storage tanks, slotted plastic pipe is used as well casing, and the pick-up tubes are inserted in the wells.

SYSTEM OPERATION

Before drawing a sample from any port, all valves are closed and the system is checked for leaks.

At the beginning of each day the control port is opened and the results of a test of the air from that port are used to automatically calibrate the system to compensate for variables in humidity, vapor levels, and other factors that could invalidate the tests. If, for any reason, the control port registers an unacceptably high vapor level, the alarm is activated.

(continued)

Description....continued

During the day, each port is monitored sequentially three times a day for a period of thirty minutes to ensure that an accurate sample is obtained.

If an unacceptable hydrocarbon vapor is detected at any monitoring point in three successive samplings, an audio alarm is sounded, a visual alarm is activated, and the documentary data is entered by the printer.

When the system is in its alarm mode it will sound its audio signal four times every thirty minutes until the signal is turned off by pressing a button on the outside of the enclosure. The visual indicator will remain illuminated until it is reset from inside the enclosure.

If no alarm is tripped, the only printed documentation is a weekly dated and timed report indicating that the system is operating normally.

FUNCTIONAL SAFEGUARDS

Every effort has been made to ensure that the system delivers optimum performance while minimizing false alarms and the need for service.

In addition to triggering an alarm only after unacceptable levels have been observed in three successive samplings at a given location, Soil Sentry will automatically cycle any solenoid three times to remedy a temporary sticking problem before reporting a system malfunction and it will reverse the vacuum action of the aspirator in an attempt to clear any port in which a blockage is observed.

SYSTEM SECURITY

Because Soil Sentry was designed to satisfy regulatory requirements, it incorporates features to prevent tampering and the accidental loss of data.

All functional components are housed in a locking, metal cabinet.

Inside that secure environment, the system monitors its power status, access door position, sampling tube integrity, and system settings. If the system is compromised, an alarm will sound and a written record of the incident will be provided by the printer.

Back-up power for the real time clock in the system is included as a further safeguard.

####

1.0 FUNCTIONAL : TEST CONTAINED AMBIENT ATMOSPHERES FOR GASEOUS HAZARDS.
.1 **CLEARANCE** : FULL FRONT DOOR ACCESS TO COMPLY WITH REGIONAL LAWS & STATUTES.

2.0 SAMPLING AREAS : ASPIRATOR PUMP AND TRANSPORT TUBES.
.1 **SAMPLING POINTS** : 1 TO 18 (SWITCH SELECTABLE) PLUS BACKGROUND POINT
.2 SAMPLING POINTS : GROUND LEVEL INLETS OR DOUBLE WALL INTERSTITIAL CAVITIES.
.3 SAMPLING TUBES : ¼" POLYPROPYLENE (OR SIMILAR INERT MATERIAL)
.4 SAMPLING WELLS : TBD
.5 SAMPLING RATE : EACH POINT THREE TIMES PER DAY.

3.0 ALARM MODES : FUEL HAZARD, RESTRICTED PORT, OPEN PORT, CHANGE ALARMS
.1 FUEL HAZARD : 300 TO 6000 PPM (IN 20 STEPS) (± 20%), SWITCH SELECTABLE THRESHOLD
.2 RESTRICTED PORT : CRIMPED TUBE, WATER IN TUBE, CLOGGED FILTER, VALVE FAILURE, DEFECTIVE TUBE TERMINATION.
.3 OPEN PORT : CUT TUBE, DISCONNECTED TUBE, DEFECTIVE TUBE TERMINATION.
.4 NOISE : LOW PAPER, INTERMITTALLY TRAPPED LIQUID.

4.0 PRINTED RECORDS : ALL ALARMS, POWER UP, POWER INTERRUPTION, DOOR OPEN, HOURLY STATUS, CALIBRATION/TEST, FREEZE PAUSE.
.1 DATA ACCESSIBILITY : VISIBLE & ACCESSIBLE ONLY TO AUTHORIZED SERVICE COMPANY OR ENFORCEMENT ENTITY.
.2 FUEL HAZARD ALARM : EACH DAY, ALL PORTS ABOVE SELECTED THRESHOLD. *
.3 RESTRICTED PORT : EACH DAY, ALL PORTS BELOW MINIMUM FLOW RATE. *
.4 OPEN PORT : EACH DAY, ALL PORTS ABOVE MAXIMUM FLOW RATE. *
.5 POWER INTERRUPTION : AFTER POWER FAILURE AT POWER UP, POWER UP TIME AND DATE ONLY PLUS "POWER RESTARTED"
.6 DOOR OPEN : TIME & DATE OF OPENING & TIME & DATE OF CLOSING.
.7 HOURLY STATUS : EVERY 7 DAYS AFTER INITIALIZATION, DATE IS PRINTED WITH WORD "OPERATIONAL"
.8 TIME & DATE : TIME & DATE ARE PRINTED FOR EACH RECORD (OR BLOCK OF RECORDS)
.9 CALIBRATION/TEST : "EXTERNAL TEST MODE"; SET THRESHOLD, BACKGROUND PPM, SAMPLE GAS RESPONSE, ACTIVE PORT PRESSURES, ZERO FLOW PRESSURE, TERMINATED BY "END OF TEST MODE," TIME & DATE.
.10 PORT FLOW TEST : FLOW RATE (OR PRESSURE DROP) FOR EACH PORT
.11 FREEZE PAUSE : BEGINNING & ENDING TIME & DATE FOR FREEZE PAUSE.
.12 MISC : LOW PAPER (SINGLE), LIQUID IN INTERVAL TRAP (RETRIGGER)

5.0 ALARM INDICATORS : TONE & LAMP
.1 ALARM TONE : a. SAME TONE FOR 4 SMART ALARMS EVERY HALF HOUR
b FIELD ADJUSTABLE ALARM "SHUT TO LOUD."
c OPERATOR ADJUSTABLE (BUTTON OUTSIDE CASE)*
.2 ALARM LAMP : a. LIGHTS "CALL SERVICE *_____" MESSAGE
b RESETTABLE ONLY BY AUTHORIZED SERVICE/ENFORCEMENT ENTITY OR POWER FAILURE *
* TIME & LIGHT WILL RETRIGGER WITHIN 24 HOURS IF FAULT CONTINUES TO EXIST

6.0 SECURITY :
.1 KEY LOCK : ACCESS DOOR KEY LOCK, KEYS TO AUTHORIZED SERVICE/ENFORCEMENT ENTITYS PERSONNEL
.2 SEAL : TWO LOOPS ACROSS DOOR OPENING UNLESS OPTIONAL SEAL LOOP IS BROKEN
.3 PRINTED RECORD : PRINTED RECORD & REAL TIME CLOCK/CALENDER WITH BATTERY BACKUP DISCHARGES LIKELIHOOD OF TAMPERING SUCCESS.
.4 LICENSED SERVICE CO : A FEW RELIABLE PEOPLE EVALUATE ALARM CAUSE, RUN & MAKE REMEDIED MAINTENANCE.
.5 TAMPER ALARMS : TIME TAMPER ALARM & DOOR OPEN & POWER UP RECORDS

7.0 FALSE ALARM SUPPRESSION :
.1 THREE CONSECUTIVE READINGS FOR A GIVEN PORT MUST EXCEED THE THRESHOLD TO TRIGGER ALARM.
.2 THREE RESTRICTED OR OPEN PORT RESULTS MUST BE WRITTEN FOR A GIVEN PORT, WITHIN A SINGLE 30 MINUTE TO TRIGGER ALARM.
.3 FREEZE PAUSE SWITCH MAY BE FIELD SET TO PLACE UNIT IN TEMPORARY PAUSE FOR DURATION THAT OUTSIDE TEMPERATURE IS BELOW 36°F (2.2°C)

8.0 SPECS :
.1 POWER : 117 VAC 5 AMP @ 50 WATTS
.2 HOSE CONNECTION TO PROBE : 4 FT. LENGTH
.3 ENVIRONMENTAL : INSIDE MOUNT ONLY (CONTROL UNIT), 0 TO 55°C, 10 TO 95% R.H. (0 TO 100% AT END OF SAMPLING TUBE).
.4 BACKUP BATTERY : 72 HOURS TO FULL CHARGE, 72 HOURS MAY PURGE - DOWN ARE FULL CHARGE (CLOCK/CALENDER BACK-UP ONLY).

* NOTE :
RATES WILL OCCASIONALLY BE RECORDED IF OPTIONAL FREEZE PAUSE IS SELECTED. (SEE 7.5) ALTERNATE OPTION IS CONTROLLED SAMPLING TUBE ROUTING TO KEEP ALL POINTS OR EACH TUBE ABOVE 35°F AT ALL TIMES.

REVISIONS			
REV	DESCRIPTION	DATE	APPR

2.0 CONSTRUCTION : (SEE FIGURE 1)
.1 **MAIN ENCLOSURE** : JIC BOX OR SIMILAR
.2 SHALL MEET OR EXCEED UL- REQUIREMENTS.
.3 **GAS SENSOR** : BULK SEMICONDUCTOR.
.4 **TEMPERATURE SENSOR** : EPOXY ENCAPSULATED THERMISTOR
.5 **PUMP** :
.6 **VALVES/MANIFOLD** :
.7 **PRESSURE REGULATOR** :
.8 **PRESSURE TRANSDUCER** :
.9 **MICROPROCESSOR** :
.10 **PRINTER** : 16 CHARACTER THERMAL PRINTER WITH TEAR-UP BAR & TEAR BAR.

10.0 RELATIVE SENSITIVITIES TO HARMFUL GASSES (APPROX)
.1 GASOLINE : 1.0
.2 CARBON MONOXIDE : 0.2
.3 METHANE : 0.6
.4 PROPANE : 1.2
.5 ETHANOL : 0.5
.6 FREON 12/22 : 0.3
.7 HYDROGEN : 2.3
} TENTATIVE & SUBJECT TO CHANGE

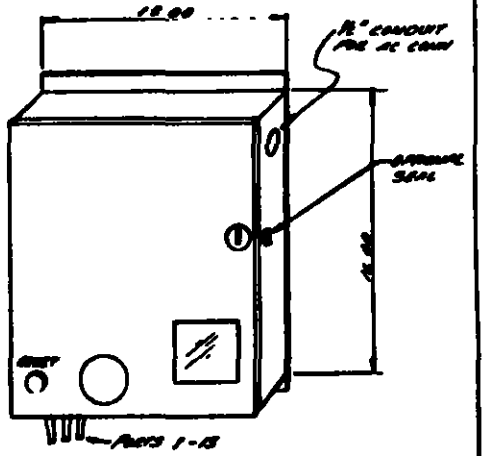
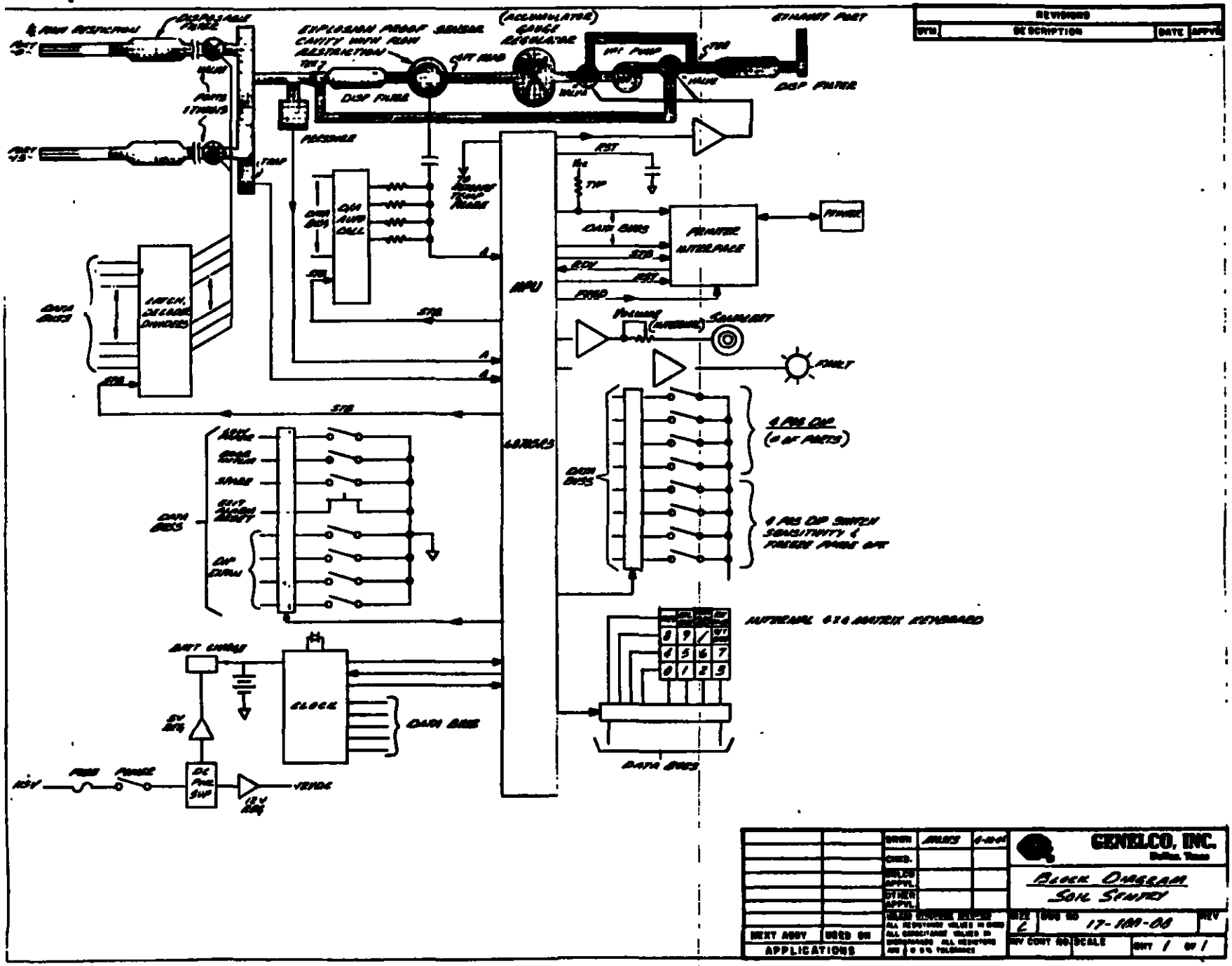


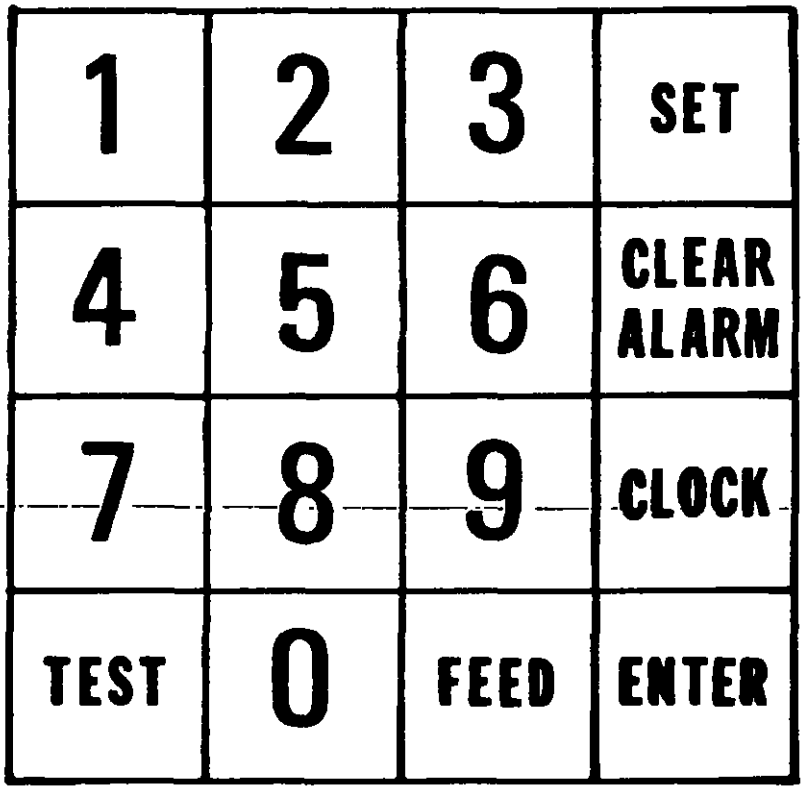
FIGURE 1

PRERELEASE 'A'

		DRWN	[illegible]	1-9-90	GENELCO, INC. Dallas, Texas
		CHKD			CUSTOMER INFORMATION DRAWING
		ENGR APPVL			17-100A SOIL SENTRY
		OTHER APPVL			
NEXT ASSY.	USED ON	PROPRIETARY & CONFIDENTIAL ...			SIZE C DWG NO 17-100-90 REV
APPLICATION					SHT 1 OF 1


REVISIONS
DESCRIPTION
DATE
APPVD
EXHAUST PORT
DISP FILTER
ACCUMULATOR
GAUGE
REGULATOR
MPU
ADDRESS
DATA BUS
STB
RST
FAULT
ALPHANUMERIC 6 X 6 MATRIX KEYBOARD
CLOCK
DATA BUS
CENELCO, INC.
Dallas, Texas
BLOCK DIAGRAM
SOIL STUDY
DWG NO
17-1111-08
REV
SCALE
SHT 1 OF 1
NEXT ASSY
USED ON
APPLICATIONS

KEYBOARD AND INSTRUCTIONS



1. Set must be pressed to activate keys.
2. After pushing clear, enter causes the action, set aborts the action, all others are inactive.
3. After pushing clock and new setting, enter updates clock, set aborts the action, all other keys are inactive.
4. Releasing feed key causes return to run with no other action.
5. Pressing test and a number goes to test only.
6. Press set, enter, reads dip switches only.

SOIL SENTRY - OPERATIONAL DISCRIPTION

There are 3 modes of operation:

A. Set mode

B. Test mode

C. Run mode

On power up, the soil sentry is in run mode and only 2 manual functions are active:

1. On the outside of the case, the sound alarm reset.

2. Inside the "locked" cover, the keyboard set switch.

All other functions are automatic and can only be changed by entering set mode.

A. Set Mode

Set mode is activated by pressing set on the keyboard. Set mode is printed and the entire keyboard is activated. This mode is exited by pressing enter. If no additional keys are pressed, exit occurs automatically in 60 seconds. No changes to run mode occur unless they are entered by keyboard or dip switches.

The dip switches are read on exiting this mode and should be set at this time.

In addition to set and enter, the keyboard has numbers 0-9, clear alarm, clock, test and feed keys. They function as follows:

1. Feed - advances printer paper only.

2. Test - on pressing test, then a digit 0-9, a test mode will be entered and printed.

3. Clock - pressing clock prints current time, date, and waits for a sequence of five 2 digit numbers, day 01 through 31, month 01 through 12, year 01 through 99, hour 00 through 23, minute 00 through 59; example: 17 May 84 23:03. Press 17 05 84 23 03 enter.

4. Clear Alarm - Pressing clear alarm will clear all port alarm flags, turn off sound and LED.

On pressing enter, the following message will be printed:

```
Date        17 May 84 23:03
Status      Running
Alarms      Ports restricted      The alarm flags will be printed
            #00 #01 #02 etc.      or the word "clear"
            Ports open #03 #12
            Ports vapor H1
            #07 #09
Dip Sw      Active ports  12
Status      Sensitivity   8
            Low Temp      On
```

B. Test Mode

Test mode is entered by pressing the test key while in set mode, then pressing a single digit for choice of test.

Press	Test 0	Return to set mode
	Test 1	Calibrate
	Test 2	Burn in
	Test 3	Diagnostic
	Test 4 through 9	Reserved

Test 1 - Calibrate - on site use.

This test starts at port "0" and makes a pressure test and prints the pressure value, then increments to next port at 10 sec intervals. After it prints the value of port "13", it measures the vapor value of port 13 for 5 minutes at 30 sec intervals and prints them. It then exits to run mode with time, date, running message.

Example:

```
00 pressure 88
01 pressure 75
     etc
13 pressure 82
13 vapor    99
13 vapor    88
13 vapor    77
     etc
```

Test 2 - Burn in.

This test runs the run mode at high speed. To start press test 2, then after "test 2" is printed, press a 2 digit number, 01 to 99 for the hours test is to be run. The printer will print the hours remaining each hour and sound the alarm when complete. It will then return to run mode with time, date, running, printout.

Example: Test 2
Time remain 99
98
97
etc

Test 3 - Diagnostic.

This test is entered from set mode by pressing test 3, then after test 3 is printed, key in a 2 digit number, ØØ to 13, for which port is to be examined. The pressure and vapor values are measured and printed every 1Ø sec until another 2 digit number is keyed in or set is pressed. On set, it returns to run mode with time, date, running printout.

Example: Test 3
ØØ pressure 75
ØØ vapor 69
etc

C. Run mode

Run mode is the normal running condition for soil pollution monitoring. This mode is entered on power up and as exit from all other modes. Any power up causes the dip switches to be read and the following printout:

Date	17 May 84 23:Ø3		Current
Status	Active ports 12	}	conditions
	Sensitivity 8		& settings

Entry from set mode causes port alarm status to be printed, also; see set mode.

Entry from test mode causes time, date, running message only.

If there are no mode changes or alarms, the only printout is time, date running every seven days.

Run mode operation.

At turn on, initialization of inputs, outputs, clearing RAM, then loading program and variables occurs. Other entries to run mode are made without initialization so that status is not lost.

Auto calibrate is then done, port ØØ is turned on and pressure is checked, the vapor sensor D/A is then set to calibrate level. This is repeatably done and compared to limits preset. After approximately 3Ø minutes, if the readings are within limits, the D/A setting is saved. Thus the background level is established for the next 24 hours. Out of limits causes shutdown and call for service.

During operation, there is continuous monitoring of door interlock, paper supply, external reset, internal reset, and below 34 degrees F freeze halt if enabled.

1. For internal reset, see set mode.

2. External reset turns off sound and prints time, date and the word reset.

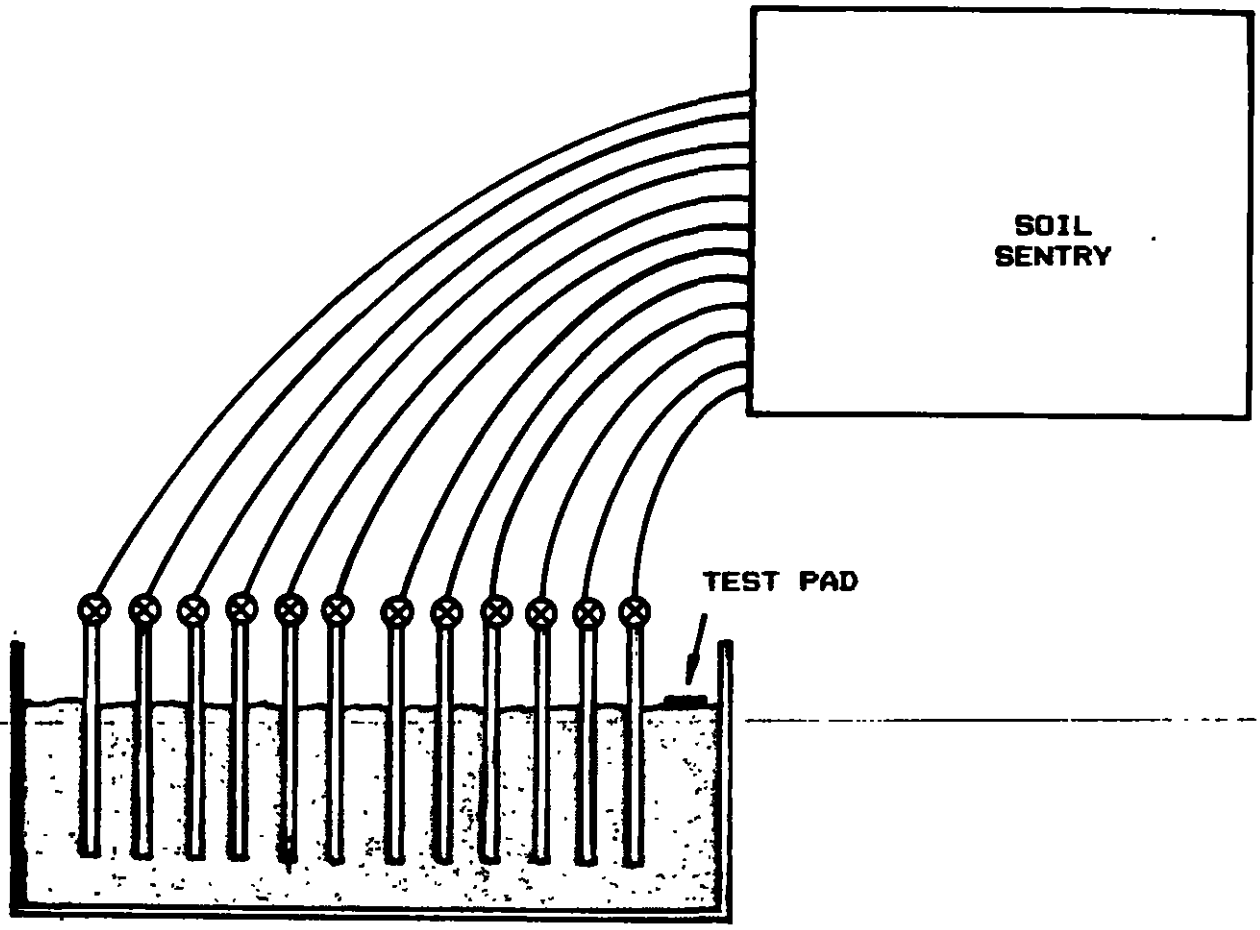
3. Paper low causes light and prints paper low one time each day until cleared.

4. Door interlock causes time, date printout and the word dooropen and doorclosed, noting both transitions of interlock switch.

5. Freeze halt is monitored continually. Time, date, the word freeze is printed noting stop and start time.

External reset, door interlock, test and set mode, and freeze halt are the only real time printing. All other printing is once per day or less.

C.



1. Soil

   a. 50% clay
      50% sand
         at 15% moisture
            50% moisture
               saturated at water table

2. Chemicals

   a. Acetone
   b. Gasoline (reg)
   c. Gasoline (unlead)
   d. Methylene Chloride
   e. Tri-chloroethylene (TCE)

3. Temperature

   45 deg. F - 78 deg. F

4. Procedure

   a. Soil was renewed after each chemical test.
   b. Sensor was initiated.
   c. 10 ml of test solution was placed on the test pad.
   d. Test completed when all sensors register leak or 5 days.

5. Data

a. 15% moisture — Acetone

Day 1 - Initiation & sample placement
Day 2 - Sensors 1, 2, 3, 4
Day 3 - Sensors 1, 2, 3, 4, 5, 6, 7
Day 4 - Sensors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Day 5 - -------

b. 50% moisture — Acetone

Day 1 - Initiation
Day 2 - Sensors - all
Day 3 - -------
Day 4 - -------
Day 5 - -------

c. 15% moisture — Gasoline (reg)

Day 1 - Initiation
Day 2 - Sensors 1, 2, 3
Day 3 - Sensors 1, 2, 3, 4, 5, 6, 7
Day 4 - Sensors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Day 5 - -------

d. 50% moisture — Gasoline (reg)

Day 1 - Initiation
Day 2 - Sensors 1, 2, 3, 4
Day 3 - Sensors 1, 2, 3, 4, 5, 6, 7,
Day 4 - Sensors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Day 5 - -------

e. 15% moisture — Gasoline (unlead)

Day 1 - Initiation
Day 2 - Sensors 1, 2, 3
Day 3 - Sensors 1, 2, 3, 4, 5, 6, 7
Day 4 - Sensors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Day 5 - -------

f. 50% moisture — Gasoline (unlead)

Day 1 - Initiation
Day 2 - Sensors 1, 2, 3, 4, 5
Day 3 - Sensors 1, 2, 3, 4, 5, 6, 7
Day 4 - Sensors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Day 5 - -------

g. 15% moisture — Methylene Chloride

Day 1 - Initiation
Day 2 - Sensors 1, 2, 3, 4
Day 3 - Sensors 1, 2, 3, 4, 5, 6, 7
Day 4 - Sensors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
Day 5 - Sensors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

h. 50% moisture — Methylene Chloride

Day 1 - Initiation
Day 2 - Sensors 1, 2, 3, 4, 5
Day 3 - Sensors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Day 4 - Sensors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Day 5 - -------

i. 15% moisture — TCE

Day 1 - Initiation
Day 2 - Sensors 1, 2, 3, 4
Day 3 - Sensors 1, 2, 3, 4, 5, 6, 7
Day 4 - Sensors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Day 5 - Sensors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

j. Sample tube material was changed from PVC to PVDF due to compatability problems with Methylene Chloride.

k. Water table saturated — Gasoline (unleaded)

Day 1 - Initiation
Day 2 - Sensors 1, 2, 3, 4
Day 3 - Sensors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Day 4 - -------
Day 5 - -------

6. Conclusion

Device performed as claimed. Sensitivity was equal with all solvents triggering response.

25. To Carole A. Onorato; From Duane Marshall, Regulatory Affairs Program Manager; September 20, 1984; Subject: Request for Draft Underground Tank Regulations

1/24 1-EAO
~~2. WGP~~
3. Ted Sen
Please respond w/ form letter

NATIONAL COUNCIL OF THE PAPER INDUSTRY FOR AIR AND STREAM IMPROVEMENT, INC.
260 MADISON AVE. NEW YORK, N.Y. 10016 (212) 532-9000

Duane W. Marshall
Regulatory Affairs Program Manager
(212) 532 9435

September 20, 1984

Ms. Carol Onorato
California Water Resources Control Board
P.O. Box 100
Sacramento, CA 95801

Dear Ms. Onorato:

The National Council is endeavoring to assemble for the benefit of its member companies information which will be of use in the development and implementation of programs for assuring the integrity of underground storage tanks.

In the interest of profiling the character of state and local regulations being put into place to deal with leaking tanks, I would be grateful if you could furnish me with copies of any relevant draft or final regulations applicable in California.

Sincerely,

Duane W. Marshall

Duane W. Marshall
Regulatory Affairs Program Manager

DWM:gs

SEP 2 8 1984

26. To Carole A. Onorato; From Les H. Cohen; September 24, 1984; Subject: CIOMA Retained Consulting Services for Board Hearing on Underground Tank Regulations

9/28-Orig WCP Anton
cc OPBd
MAO
WRA
HMS
MM

Please respond to request for time estimate. Point out that time depends on # of speakers

LES H. COHEN & ASSOCIATES
1121 L Street, Suite 508, Sacramento, CA 95814 ■ (916) 441-7011

September Twenty-Fourth
Nineteen Eighty-Four

Ms. Carole A. Onorato, Chairwoman
State Water Resources Control Board
901 P Street
Sacramento, California 95814

RE: State Water Resources Control Board Hearing on Proposed Regulations Governing Underground Tank Storage of Hazardous Materials Tuesday, October 23, 1984

Dear Madam Chair:

I am writing to inform you that the Board of Directors of the California Independent Oil Marketers Association (CIOMA) voted unanimously to retain professional independent technical/environmental/economic consulting services to assist CIOMA in connection with the above referenced public hearing.

As you know, CIOMA represents over 400 petroleum jobbers throughout the State of California, who, in addition to retail outlets, supply over 80 percent of California commercial and agricultural needs. The Directors are genuinely concerned that the proposed regulations may well impose unfair, unnecessary and disproportionately burdensome demands upon their small member businesses.

Therefore, it is the purpose of this letter simply to inform you in advance that the following named persons will constitute CIOMA's official expert witnesses for testimony at the State Board's October 23 hearing:

1) Tom Robinson, Director and Chairman of CIOMA's Ad Hoc Committee on Underground Storage Tank Regulation

2) Leroy Nieder, Attorney at Law
Legal Counsel for CIOMA

3) Richard J. Zipp, Technical Director
Hazardous Waste Group - J. H. Kleinfelder & Associates

I would appreciate it if you would notify the appropriate staff member regarding this information and let me know approximately how much time will be allocated to CIOMA as I will be responsible for coordinating this effort.

Received DTS
OCT 1 1984

Thank you very much for your valued interest and continued cooperation in this important matter.

Warm personal regards,

LES H. COHEN

LHC:lam

cc: The Honorable Byron Sher, Member of the Assembly
Mr. Kip Lipper, Consultant, Assembly Committee on Criminal Law & Public Safety
Mr. Jim Divine, Executive Vice President, CIOMA
Mr. Tom Robinson, Robinson Oil Company
Mr. Leroy Nieder, Esq.
Mr. Walter G. Pettit, Deputy Executive Director, State Water Resources Control Board

27. To Carole A. Onorato; From Bob Shuster; October 3, 1984; Subject: Requests Permission to Speak at the October 23, 1984 Hearing

SHUSTER OIL & CHEMICAL
JOBBER, SHELL PETROLEUM PRODUCTS
P. O. BOX 456 - ESCONDIDO, CALIFORNIA 92025
(714) 745-0591

OCT 09 1984

October 3, 1984

Ms. Carole Onorato
California State Water Resources
Control Board
Paul R. Bonderson Bldg.
901 P Street
P.O. Box 100
Sacramento, CA 95801

Dear Ms. Onorato:

I respectfully request permission, as a private citizen and independent businessman, to speak at the hearing on underground storage/hazarderous substances, to be held in Sacramento on October 23, 1984.

Thank you for your attention to my request.

Sincerely,

Bob L Shuster

Bob L Shuster

28. To Carole A. Onorato; From Bert W. McCorinack, President, McCorinix Corps; October 24, 1984; Subject: Requests Permission to Speak at October 23, 1984 Hearing

OCT 05 1984

McCORMIX CORP.
Wholesale petroleum and chemical products

22 North Salsipuedes Street
P O Box 848
Santa Barbara,
California
93102
(805) 962-5888

October 4, 1984 REGISTERED MAIL

Miss Carole Onorato
State Of California
State Water Resources Control Board
Paul R. Bonderson Building
901 "P" Street
P.O. Box 100
Sacramento, Calif 95801

Dear Miss Onorato,

In reference to your Public Hearing on October 23, 1984. On Hazardous Substance Underground Storage Tanks.

I would like very much a allocation of time to speak on behalf of my Corporation Mc Cormix Corp., and our commercial and agricultral accounts. Being I am the last Petroleum Bulk Plant left in Santa Barbara out of nine (9). And if your present regulations are adopted there will be none.

Thank you in advance for your cooperation and I am looking forward in speaking at your hearing of October 23, 1984.

Sincerly,

Bert W. Mc Cormack
President

BWMc/sr

29. To Carole A. Onorato; From J. W. Cohn, Ph.D., Avanti Management; October 8, 1984; Subject: Requests Permission to Speak at October 23, 1984 Hearing

T.E.29. OCT 11 1984
Orig-Ed Anton SWR
cc'd: ~~Board, MAC~~, WRA, WGP, CMWils.

AVANTI MANAGEMENT, INC.

920 South Robertson Blvd., Suite 4 • Los Angeles, California 90035 • (213) 657-1034

October 8, 1984

Ms. Carole Onorato
c/o State of California
State Water Resources Control Board
Paul R. Bonderson Building
901 P Street
P. O. Box 100
Sacramento, California 95801

Re: October 23rd open hearing

Dear Ms. Onorato:

I would like to address the Board at the open hearing on October 23. I would represent Avanti Management, Inc. a gasoline marketer with ten (10) outlets. I understand that I will be allotted 5-10 minutes for my contribution. I will be addressing the cost problems for small independent marketers associated with the underground tank checking, testing, monitoring and clean up of gasoline and diesel fuel.

Sincerely,

Dr. J. W. Colin, Phd., Management-Finance
P. E. #30159 (Texas)

JWC:jt

977

30. To Carole A. Onorato; From Robert P. Short, Goodrich Oil Co.; October 8, 1984; Subject: Requests Permission to Speak at October 23, 1984 Hearing

OCT 10 1984

10-8-1984

Dear Commissioners

I would like to be allocated time to address the issue of underground storage tanks of hazardous materials at your October 23 public hearing

Sincerely

Robert S Short

Endrick Oil Co

PO Drawer 369

Turlock Calif. 95381

31. To Edward C. Anton, From Diane Phillips, McCoy and Associates; October 8, 1984; Subject: Request for Technical Paper for McCoy and Associates publication, "Hazardous Waste Consultant"

McCOY and ASSOCIATES
Hazardous Waste Consultants

13131 West Cedar Drive, Lakewood, Colorado 80228 (303) 987-0333

October 8, 1984

Ed Anton
State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95801

Dear Mr. Anton:

McCoy and Associates publishes The Hazardous Waste Consultant, a bimonthly journal dealing with toxic and hazardous waste issues of interest to industry, government, and the technical community. In this journal, we review technical papers of importance that have been presented at recent conferences and symposia.

We would like to obtain a copy of the paper you presented at the recent "ASCE 1984 Annual Convention" that was held October 1-5, 1984 in San Francisco, California.

Thank you for your time and assistance.

Sincerely,

Diane Phillips

Diane Phillips

P.S. I have enclosed a brochure describing the Index To Federal Hazardous Waste Regulations. Your organization may be interested in this newly published book.

32. To Kenneth Willis; From Donna Blair, ARCO; October 11, 1984; Subject: Enclosed with ARCO's Comments on Draft Underground Tank Regulations

AtlanticRichfieldCompany
Public Affairs
1100 J Street
Suite 705
Sacramento, California 95814
Telephone 916 448 2557

Donna C. Blair
Associate Director
Western States
Government Relations

10-11 KWW
Copies: WGP, Anton, MAC, DER
(All Bd. Members received similar letters but with different meeting dates)
FYI - KWW said no staff person necessary at this meeting.

October 11, 1984

Mr. Kenneth Willis
State Water Resources Control Board
901 "P" Street, 4th Floor
Sacramento, CA 95814

Dear Mr. Willis:

We are enclosing for your information and consideration Atlantic Richfield Company's specific comments on the draft underground tank regulations resulting from the passage of AB 1362.

These are being submitted to you in advance of our meeting scheduled for October 16 in order to facilitate our discussions at that time. If you have any questions or wish further elaboration of the points contained herein before our meeting, please call me.

Sincerely yours,

Donna C. Blair

DCB/rf
Enclosures

Received DTS
OCT 12 1984

AtlanticRichfield Company
515 South Flower Street
Mailing Address: Box 2679 - T.A.
Los Angeles, California 90051
Telephone 213 486 3511

October 11, 1984

TO: Members - California State Water Resources Control Board

SUBJECT: CALIFORNIA DRAFT UNDERGROUND TANK REGULATIONS
ARCO'S CONCERNS

We have developed a concise summary of our major concerns with respect to the subject draft regulations. Be advised that, so far, ARCO's concerns are consistent with those expressed by WOGA in the October 2, 1984, draft comments.

There are two key concerns which question the jurisdiction of the rulemakers (as allowed by the statute) to develop the draft regulations as they presently exist. The statute provides for a list of alternative monitoring methods for existing tanks which "may be required by the local agency" while the draft regulations would require specific monitoring methods. This would strip the local agencies of the intended discretion to choose among alternatives. The second key concern is where the draft regulations specify expensive drilling and sampling requirements aimed at discovering past leaks and groundwater contamination. The statute is consistently written in the present and future tense. Discovery of past releases is clearly not an authority granted by the enabling statute.

The following are some of the more specific major concerns:

DRAFT REGS	AB 1362 STATUTE	COMMENTS
2620	25280	The definition of "motor vehicle fuel" should be consistent with the intent of the statute to control the storage of fuels, not vehicles.
2620	25280	The definition and use of the word "pipe" should exclude lines that do not normally contain liquids.
2632 (e) and 2645-2646	25284 (b) and 25284.1 (b)	The statute does not call for expensive "continuous" monitoring as specified in the draft regulations. With secondary containment, such monitoring should be based on the half life of the secondary container. In general, continuous

DRAFT REGS	AB 1362 STATUTE	COMMENTS
(Continued)		monitoring is an unproven technology with very little field experience/exposure.
2633	25284(a) (7)	Double wall tanks more than satisfy the provisions specified for new motor vehicle fuel tanks but the tank testing requirements should not apply.
2634 (d) (1) and 2643 (f)	---	A 24-hour loss or gain of 50 gallons at a high volume service station is not uncommon. Suggest the daily trigger for investigative action be set at 100 gallons or 10% of daily throughput, whichever is higher. Also, daily review should be specific to days of operation. This use of "daily" is also found in other parts of the draft regulations.
2635 (f) & (g)	25284 (c)	Overfill protection may be required by the local agency. The draft regulation should reflect more clearly that this is an option.
2635 (g) (1)	---	During delivery, the facility operator or the delivery vehicle operator should be in control of the filling operation.
2635 (g) (2)	---	Available capacity of the tank to be filled should be 102% of compartment to be delivered. 110% is much too large.
2640 (f)	25284.1 (b) (4)	Add a new section to be consistent with the motor vehicle fuel alternative as provided in the statute.
2642-2646	25284.1(b)	Adjust all alternative methods to make them optional, as to be determined by the local agencies.
2642 (d)	---	Fiberglass tanks should not require annual testing until 25 years from installation.

DRAFT REGS	AB 1362 STATUTE	COMMENTS
2644 and 2647	---	Exploratory boring and assurance monitoring are not provided for in the statute. Soils testing is only required to establish a baseline for future monitoring.
2645(f) (1)	---	A single demonstration of a vadose monitoring system should be available where similar substances are stored at multiple locations in similar backfill materials.
2646 (c) & (d)	---	Where groundwater is near the surface, vadose monitoring should not be required with groundwater monitoring. Both referenced sections should be deleted.
2646	---	Maximum radial distance between monitoring wells should be 40 feet for hydrocarbons because of the wide lateral spreading consistent with hydrocarbon leaks.
2646 (e) (3)	---	Two inch monitor well casings are sufficient versus 4 inch.
2646-2647 2648	---	Reference that WOGA comments will deal with the more technical problems concerning well construction and monitoring requirements.
2647	---	For more effective monitoring, monitoring of groundwater should be restricted to depths of 50 feet or less.
2651 & 2652	---	Requirements for cleanup costs and hazardous waste information should be deleted for reporting.
2672 (d)	25286	If the tank has been properly cleaned or removed, there should be no need for "ongoing" leak detection monitoring for a permanent closure.

There are many more concerns and more detailed commentary as expressed in the draft WOGA comments, but this listing will serve to cover our major concerns with the August 23, 1984, draft CA Underground Tank Regulations.

33. To Harold Singer; From Michael J. Bouton, President, Genelco Inc.; October 17, 1984; Subject: SOIL SENTRY for Use as a Leak Detector

V, E, 3.3. HJS

GENELCO, INC.

CALIFORNIA REGIONAL WATER

OCT 22 1984

QUALITY CONTROL BOARD

October 17, 1984

Mr. Harold Singer
California Regional Water Quality Board
1111 Jackson Street
Oakland, Ca 94607

Dear Mr. Singer;

I appreciate the time you have afforded us in the past concerning the underground storage tank leak problem. I want to reafirm in writing our support for early leak detection and our belief that vadose zone monitoring technology available today is the safest, most cost effective way to protect our underground water supply.

Genelco has been developing an electronic device suitable for monitoring underground fuel storage tanks. We became aware of California's legislative activity concerning underground tanks about a year ago. We understood that typically, local fire departments were responsible for enforcing this type of legislature, so we contacted Santa Clara valley Fire Departments for their input into the features and capabilities of a monitoring system. As a result of those and subsequent meetings, the present version of SOIL SENTRY evolved.

It has always been our goal to provide an early warning of hazardous material leaks. Once these hazardous materials enter the underground water supply it is not only expensive to clean up but the contaminated water may never be completely restored. It appeared to us that liquid detection schemes would require a large product leak before detection, and there was a high probability of polluting the underground water supply before detection and correction. Even though Genelco specializes in accurate and reliable detection of liquids (LEVELITE liquid level sensors and controls), we decided to pursue vapor sensing utilizing technology we had previously worked with.

In a underground storage system there is one or more tanks and a piping system to facilitate removal or addition of material to the storage tank. According to our information, the piping system can be the source of leaks 80% of the time. Any leak detection system must, therefore; take into account not only the tank but also the piping system as well.

When a leak occurs the liquid flows vertically within a 30 degree cone. The vapors from that leak propagates through the soil in a much larger area of influence than the 30 degree cone. The speed and distance these vapors travel depend on the type of soil. In the backfill of buried tanks that typically range from fine sand through course gravel the propagation is not only widespread it is also relatively fast.

SOIL SENTRY is an aspirated vapor sensing system utilizing a diaphragm metering pump to create a slight negative pressure in perforated PVC pipe placed vertically next to the tank or horizontally along and beneath piping runs. This technique aids in the propagation of vapors and will expand the natural area of influence of the vapors. By using high reliablity solenoid valves and tubing we can access twelve different areas thus insuring that any leak will be detected and at a reasonable cost.

A SOIL SENTRY has been in operation in a service station in Palo Alto for over four months. During that time two events have occured that have proved the practacallity of this system. One in particular proves the sensitivity and diagnostic capability of SOIL SENTRY. During that event a check valve located approximately ten feet from the nearest sensing location was opened spilling one half to one gallon of gasoline into the backfill of the tank. Within twenty minutes SOIL SENTRY was registering high vapor at that sensing location. Within twenty four hours the next nearest sensing location, approximately twenty feet from the spill was registering high vapors. This condition was monitored for two weeks as the vapor readings gradually subsided indicating the spill was a one time occurance, not a continuous leak. It is also interesting to note that one of these sensing locations was located parrallel to the tank fill nozzel to see if the backfill saturated with gasoline from overfill and sloppy filling practices would have enough vapor to cause the SOIL SENTRY to be ineffective. Readings at the SOIL SENTRY confirmed pollution present in the backfill but the SOIL SENTRY could be set up to ignore these vapors.

It is our strong belief, Mr. Singer, that vapor monitoring technology as employed in SOIL SENTRY is all that is required to fully protect the environment from leaking underground storage systems. This system can eliminate redundant monitoring systems thus providing a cost effective solution to the leak detection problem. Our SOIL SENTRY goes beyond simple vapor monitoring by incorporating sofisticated hardware and software to insure that not only can vapor be detected but that the system is functioning properly and has not been tampered with. SOIL SENTRY not only monitors the underground storage system, it also monitors itself.

Genelco is obviously very proud of SOIL SENTRY. We stand behind its concept and are ready to assist in its implementation and long term service. We stake our good reputation earned over the past thirteen years on the suitability of this product. If we can be of any assistance please do not hessitate to call.

Best regards,
Genelco, Inc.

Michael J. Bouton
President

MJB/ec

cc Reinhard Hanselka
Advanced Industrial Designs

Chuck Rowley

34. To Michael A. Campos; From Betty J. Seldner, Performance Improvement Programs, H. R. Textron, Inc.; October 22, 1984;. Subject: Discusses Different Rules Governing Different Areas Change in Deadline for Monitoring Devices, Request Information

OCT 26 1984

HR TEXTRON

HR Textron Inc.
a Subsidiary of Textron Inc.

25200 West Rye Canyon Road
Valencia, Calif. 91355
805/259-4030
TWX 910/336/1438 TELEX 65/1492

October 22, 1984

Mr. Mike Campos
Executive Offices
State Water Resources Board
901 "P" Street
Sacramento, CA 95814

Dear Mr. Campos:

We have several underground tanks and are working with the California Regional Water Quality Control Board. They have been very helpful and we are complying with their requirements.

However, that is only for the plant in Pacoima - part of the City of Los Angeles.

We also have plants in the unincorporated areas of the L.A. County and Ventura.

Each area has a different set of rules. When you compile the opinions voiced at the October 23 meeting on the regulations, please consider the question "Who is in charge?"

Also, it is my understanding that the January 1, 1985 deadline for monitoring devices will be slipped to July 1, 1985. Please send us a letter stating the date change. As you know, it was not realistic for all California companies to install leak detection monitors by January 1, 1985.

Thank you for your consideration to these matters.

Sincerely,

HR TEXTRON INC.

Betty Seldner

Betty J. Seldner, Director
Performance Improvement Programs

BJS:wb

Received DFS

OCT 29 1984

Volume 23, No. 37 Sacramento October 12, 1984

REPORT

California Manufacturers Association

Hearing Set For October 23

ASSOCIATION TO ADDRESS UNDERGROUND TANK REGS

A special meeting of the California Manufacturers Association Environmental Quality Committee was held September 20 to discuss the State Water Resources Control Board's proposed Subchapter 16 regulations dealing with underground storage tanks.

The committee raised questions concerning the scope of coverage of the proposed program, including both the tanks and materials covered, and the proposed monitoring program for existing tanks. In each of these areas as well as others, the committee believed the regulations exceeded the authority granted the Board by AB 1362, Byron Sher, D-Palo Alto, the original enabling legislation. In addition, it was felt that many of the proposals were unnecessary to adequately protect the state's soils and waters.

While the original legislation was directed towards tanks that were actually buried in the ground, the proposed regulations would apply to tanks which are "below the ground surface." Under this definition tanks which are not buried, but set below grade for spill containment purposes, would be covered, as would tanks which are in the basement of a building

There is also concern with the materials which will be covered under the proposed regulations. Although the regulations duplicate the lists of potential candidates for regulation, which include the Directors List, Hazardous Substances defined in the Health and Safety Code and materials classified by the National Fire Protection Association, the board has not attempted to eliminate any materials from these lists, nor has it provided a process under which an exemption could be obtained.

The committee was particularly concerned with the proposed monitoring requirements for existing tanks. While the law allows the board to develop a number of monitoring options from which the operator and local enforcement agency could choose, proposed regulations have identified a laundry list of monitoring techniques and required all to be implemented. Potentially, an operator could be forced to do daily visual monitoring, daily inventory control, install a continuous soil monitoring system, do soil borings, install a ground water monitoring system and test the tank on an ongoing basis.

A public hearing on the proposed regulations will be held on Tuesday, October 23 at 1416 9th Street, Sacramento. The California Manufacturers Association will present these, and other concerns at the hearing and encourages all members to participate.

GOVERNOR SIGNS 'JOBS CZAR' LEGISLATION

Legislation sponsored by Assemblyman Gray Davis, D-Los Angeles, and signed into law by Governor George Deukmejian for the first time in the state's history will designate a "jobs czar" for California.

The legislation, AB 1878 (Chapter 1670, 1984), was supported by the California Manufacturers Association, and requires the Governor to designate a cabinet secretary who has been confirmed by the Senate to carry the title and responsibilities as "the Governor's Secretary for Job Development."

Although the measure provides several enumerated duties, overall the new secretary is to "serve as the state's primary representative for attracting businesses to, and retaining businesses, within the state."

Among other things, the secretary is authorized to negotiate written agreements with persons or corporations who wish to locate or expand operations in California, but such agreements cannot create any obligation, debt or liability against the state.

The secretary would have no direct jurisdictional authority over the internal operations of any agency over which he does not already have authority. He will, however, serve as a coordinator of information and a

Continued on page 2

35. To Warren Noteware; From Assembly Person Norman Waters; October 22, 1984; Subject: Understanding of the Legislative Intent of AB 1362 as It Applies to Agriculture

10/23 Board Members Received ccs
cc: SAB
John Richards
WGP - WRA
MAC - Finlayson

STAFF
Phil Dowd
Consultant
Susan Reed
Consultant
Betty J. Johnson
Secretary

Assembly California Legislature

Assembly Committee on Agriculture

CHAIRMAN
NORMAN S. WATERS
ASSEMBLYMAN, SEVENTH DISTRICT

State Capitol
Sacramento, California 95814
(916) 445 1918

October 22, 1984

Warren Noteware
Water Resources Control Board
901 P Street
Sacramento, CA 95814

Dear Mr. Noteware:

The purpose of this letter is to state my understanding of the legislative intent of AB 1362 (Sher). For the following reasons, I believe AB 1362 does not apply to California's agricultural industry, including the production of food and fiber and all related activities.

When AB 1362 was presented by Assemblyman Sher on the Assembly Floor, I raised the question as to whether or not his bill would adversely impact agriculture. He responded by stating he was accepting an amendment exempting agriculture, which in his words, "would assure that my bill would not adversely impact the agricultural industry." Based on this assurance, I voted for the bill.

Had I known that AB 1362 would be interpreted to include only some segments of agriculture, I would have voted against the bill. This being the case, I request that agriculture, including cotton ginning, be deleted from your proposed regulations, or, in the alternative, that clarifying legislation be introduced and adopted prior to the implementation of any such regulations.

Your favorable consideration of this request will be greatly appreciated. Please contact me if I can provide you with any additional information.

Sincerely,

NORM WATERS
NW:plj

36. To Harold Singer; From Kirk Rossman, Vice President, American Welding Supply; October 23, 1984; Subject: Wants to Know What Affect Proposed Regulations Will Have on His Business

I.E. 36. H3

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10/29/84
Referred Mr. Rossman to Peter Jones (City of San Jose)
Tom Micka

October 23, 1984

Western States Oil Co.
Division of Technical Services
P. O. Box 100
Sacramento, Ca. 95801

Attn: Harold Singer

Dear Mr. Singer:

We recently received a letter from Mr. Thomas A. Lopes of Western States Oil Co., SAn Jose, Ca. regarding Adoption of Proposed REgulations governing Underground Storage of Hazardous Substances by the State of California Water Resource Control Board, and we would like any information that might help us ascertain what affect these regulations will have on our business. We currently have a 10,000 gallon tank of unleaded fuel, and a 5,000 gallon tank of diesel fuel at our location, and at our Carbonic Service Inc. location, we have a 500 gallon tank of regular gas.

If you need any additional information about these tanks in order to supply this information to us, please do not hesitate to contact me.

Yours truly,

Kirk Rossmann, kph

Kirk Rossmann
Vice President

KR/kph

Received DHS

OCT 26 1984

37. To Harold Singer; From Robert N. Harrison, Assistant General Manager, Western Oil and Gas Association; October 26, 1984; Subject: Clarification of WOGA's Position on Monitoring Alternatives for Existing Motor Vehicle Fuel Storage Tanks in Subchapter 16 Proposed Regulations Covering UGT

II.E.37 HS

A3

Western Oil and Gas Association
727 West Seventh Street, Los Angeles, California 90017
(213) 627-4866

October 26, 1984

Harold Singer
Division Technical Services
State Water Resources Control Board
Post Office Box 100
Sacramento, California 95801

Re: Clarification of WOGA's Position on Monitoring Alternatives for Existing Motor Vehicle Fuel Storage Tanks in the Subchapter 16 Proposed Regulations Covering Underground Storage Tanks

Dear Mr. Singer:

Based on comments made after the public hearing on October 23, 1984, WOGA believes that there may have been a misunderstanding with respect to its position on monitoring alternatives for existing underground storage tanks containing motor vehicle fuels in light of the statement and comments submitted by Harding Lawson Associates. In order to clarify our presentation, we offer the following summary of WOGA's position with regard to this matter:

First, Section 25284.1(b)(3) of the Health and Safety Code states that existing motor vehicle fuel storage tanks shall be monitored by using: (1) daily gauging and inventory reconciliation with proper recordkeeping;(2) periodic tank testing; and, when appropriate, (3) line leak detection capability. The language in the current draft of the proposed regulations would subject existing motor vehicle fuel storage tanks to all of the monitoring alternatives required of other tanks in addition to inventory control, tank testing and line leak detection capability. WOGA believes this is contrary to the statutory language and that only inventory control, tank testing and line leak detection capability are required.

Second, if the Board decides existing motor vehicle fuel storage tanks may be subject to other monitoring alternatives (which, we reemphasize, is contrary to the statute), the local agency implementing the regulations should be given the discretion regarding which such alternatives will be required.

Finally, although WOGA is opposed to monitoring existing motor vehicle fuel storage tanks other than by inventory control, tank testing and line leak detection capability as provided by statute, if the Board decides to impose such requirements, we have included for its consideration an alternative monitoring approach in the Harding Lawson report. These alternative monitoring requirements could be imposed on a site specific basis, if neccessary, to be determined by the local agency.

We hope that this preceding explanation clarifies our position. We also ask that you forward each Board member a copy of this letter in your next transmittal to them.

If you have any questions regarding this letter, our written comments or our oral presentation, please call Mr. Ralph Edwards at (213) 683-6335.

Very truly yours,

Robert N. Harrison by R.E.

Robert N. Harrison,
Assistant General Manager

38. To John Richards; From Richard Gray, Corporate Attorney, Wickland Oil Company; November 5, 1984; Subject: Proposed Underground Tank Regulations

NOV 6 1984 ; [redacted]

[redacted]; Harold Singer DTS

WICKLAND OIL COMPANY

RECEIVED BY
NOV 06 1984
OFFICE OF THE CHIEF COUNSEL

November 5, 1984

State Water Resources Control Board
Post Office Box 1000
Sacramento, California 95801

Attention: John Richards, Staff Attorney

Subject: Proposed Underground Storage Tank Regulations

Dear John:

This is a brief follow up to the workshop held on November 2, 1984. I would like to emphasize two points to the Staff in revising the proposed underground storage tank regulations:

(1) Regarding alternative 3 on page 24 of the Staff Report, requirement (c) appears to mandate pressurized pipelines. The Board asked you to check into the legislative intent of the following language in Health & Safety Code Section 25284.1: ". . . and whenever any pressurized system has a leak detection device to monitor for leaks in the piping." The question is whether such language requires pressurized piping in order for motor vehicle fuel tanks to be eligible for inventory reconciliation as a monitoring method. I submit that there is no such requirement implicit in the language in question. If that were the legislative intent, it would have been very easy for the legislature simply to state: ". . . and if the pipelines are pressurized and have leak detectors,"

Further evidence of legislative intent, moreover, is found in AB3781 in which Section 25284.1 is amended and renumbered as Section 25292. Specifically, subsection (b)(4)(C) states: "If a pressurized pump system is connected to the tank system, the system has a leak detection device to monitor for leaks in the piping." (emphasis added) Obviously, use of a pressurized pump system is not mandated.

1765 Challenge Way
P.O. Box 13648
Sacramento, California 95853
(916) 921-1100 Telex: 377305

owners and
operators of
REGAL

A

Received DTS
NOV 7 1984

(2) The Staff stated several times during the workshop that alternatives 3 and 4 are intended to be for motor vehicle fuel tanks. I submit that the regulations should make it clear that a local agency could not impose alternatives 1, 2, 5 or 6 on existing motor vehicle fuel tanks. Again, I think this comports with the legislative intent as set forth in my letter to Harold Singer dated October 23, 1984.

Again, I would like to compliment the Staff on its efforts to respond to the public comments made during the October 23, 1984 hearing. From Wickland Oil Company's point of view, the suggestions in the Staff Report represent a significant improvement over the initial proposed regulations.

Sincerely yours,

Rich Gray

RICHARD R. GRAY
Corporate Attorney

RRG:klg

39. To Harold Singer; From Donna Blair, ARCO; December 6, 1984; Subject: Appointment to Demonstrate UGT Tightness Precision Test Developed by ARCO

AtlanticRichfieldCompany
Public Affairs
1100 J Street
Suite 705
Sacramento, California 95814
Telephone 916 448 2557

Donna C. Blair
Associate Director
Western States
Government Relations

December 6, 1984

Mr. Harold Singer
Division of Technical Services
State Water Resources Control Board
901 P Street
Sacramento, CA 95814

Dear Mr. Singer:

In our Harvey, Illinois, Technical Center, Atlantic Richfield Company has developed a new process which we feel would be of interest to the members of the Board.

Engineers from Harvey will be in California on December 18 and we would like the opportunity to demonstrate our Underground Tank Tightness Precision Test to you and any members of your staff you feel appropriate. This is a precision test procedure presently in use, although we also utilize other methods as well.

If it is convenient, we would like to come to your office at 10:00 AM on December 18. We approximate one half hour to set up the test material, and the demonstration should last one hour. Our people will then be happy to answer any questions you may have.

Would you be kind enough to call Ms. Regina Fagan and let her know if this schedule would be convenient. We look forward to hearing from you and hope to see you December 18.

Sincerely yours,

Donna C. Blair

Donna C. Blair

DCB/rf

Received DTS
DEC 6 1984

Received DTS
DEC 12 1984

40. To Carole Onorato; From Walter Simmons, ARCO; January 4, 1985; Subject: Meeting on Issue of Underground Tank Testing

JAN 11 1985

ARCO Petroleum Products Company
515 South Flower Street
Mailing Address: Box 2679 - T.A.
Los Angeles, California 90051
Telephone 213 486 3504

R. Walter Simmons
Senior Representative
Environmental/Health Regulatory Affairs

January 4, 1985

The Honorable Carole A. Onorato, Chairwoman
California State Water Resources Control Board
P. O. Box 100
Sacramento, CA 95801

Dear Ms. Onorato:

I would like to thank you for the opportunity to meet with you and the Water Board staff on December 18, 1984 to discuss the important issue of underground tank testing. This letter summarizes the discussions at that meeting, and our thoughts on the question of certification for underground tank testing methods.

ARCO Petroleum Products Company has been actively involved in underground tank testing for many years. The ARCO Underground Tank Leak Detector was developed at our research laboratories to meet our own need for a simple, reliable method for detecting underground tank leaks down to 0.05 gallons per hour. This technology meets these objectives, as well as the tank testing requirements outlined in the draft Subchapter 16 underground tank regulations.

The technology uses an ultrasensitive photo optic device to measure the position of a float inserted into the tank for the test. All external variables are compensated for during the period of the test. These include temperature stratification, tank end deflection, evapoaration, and pressure changes. The float is positioned so that temperature induced changes in tank volume will be exactly offset by changes in buoyancy of the liquid in the tank. Leak detection, including a check for line leaks, occurs under conditions similar to normal service station operation.

Tests conducted at our research laboratories show excellent agreement between simulated and measured leaks as low as 0.03 gallons per hour. The U.S. EPA has evaluated tank testing technology currently on the market, and the ARCO Technology is under consideration as one of three test methods to be used for a nationwide underground tank survey.

The ARCO Underground Tank Leak Detector has been in commercial operation for over three years. To date, over 7000 tanks have been tested, including all ARCO-owned underground tanks in operation at our service stations. We are making this technology available to the public through licenses to trained, responsible parties. Currently, ten firms have been granted a license, including three firms operating in California.

The ARCO Underground Tank Leak Detector has been approved by regulatory agencies in New York, Colorado, Connecticut, Wyoming, and Ohio. Approvals or certifications in several other states are expected shortly. The County of Los Angeles has approved the ARCO technology, but we understand that there is no mechanism for statewide approval.

Tank testing will apparently play a key role in California's regulatory program for underground tanks. Several of the existing tank monitoring alternatives would require annual tank testing. There are many testing methods on the market which cannot accurately perform the NFPA precision test. ARCO urges the Water Resources Board to review the methods proposed for tank testing in California. A certification program should be set up so that users of tank testing services can be assured that their method meets the requirements of the draft Subchapter 16 underground tank regulations. Such a certification program would have the following elements:

(1) An engineering review of the proposed testing method to ensure that all external variables are accounted for by the test.

(2) A review of data submitted by the developer of the test which compares induced leak rates to measured leak rates down to 0.05 gallons per hour.

(3) An actual field demonstration.

The data developed by EPA in their nationwide testing program could be used as the basis for a California certification program.

If you would like further information on the ARCO tank testing program, or if we may assist you in any way, please contact me.

Sincerely,

Walter Simmons

R. Walter Simmons

RWS:cf
cc: Harold Singer
California State Water Resources Control Board

41. To Carole A. Onorato; From Frank H. Winston, Chairman and CEO, Research Consultant Consortium; January 8, 1985; Subject: Utilization of Vapor Monitoring in Backfill Areas. Represents Genelco, Inc. - encloses literature on SOIL SENTRY

JAN 9 1985 I.CAO V.F.11

RCC

RESEARCH CONSULTANT CONSORTIUM

P.O.Box 584, San Francisco 94101

(415) 386-8449

See Bill's recd Pkg - also per Mr Winston
Copies were delivered to Merksamer & Duffy

January 8, 1985

MRS. CAROLE A. ONORATO, Chairwoman
State Water Resources Control Board
Post Office Box 100
Sacramento, California 95801

Dear Mrs. Onorato:

Thank you and your staff for so quickly remedying the complaints by getting the current draft proposals for Underground Tank Regulations--Title 23--to us so promptly. Such sensitivity in a public agency is praiseworthy.

As you are aware, throughout the long process of developing these regulations my colleagues and I have been very vocal in espousing the utilization of new technology and more specifically, vapor monitoring in the backfill area of tanks. At the same time we have maintained the majority of our contact through your staff and we have provided them with the most recent scientific literature in this regard.

However, all of our input has apparently fallen on deaf ears--possibly because our client, Genelco, Inc., has a device to monitor vapors in the backfill area. As a result, I have taken the liberty of providing you with copies of the literature we have previously submitted to your staff. I hope you will have an opportunity to peruse it prior to the January 18 meeting. At that time we will present Dr. Glenn M. Thompson, President, Tracer Research Corp., Tucson, Ariz., one of the authors of the enclosed material, Mr. James Levine, an engineer with whom I am sure you are familiar, and at least one other independent engineer-scientist who is familiar with hydrocarbon plume propogation in the unsaturated (vadose) zone. Possibly these gentlemen will be able to explain the technology in a manner that is more acceptable to your staff than our previous efforts.

Our major concern, at this juncture, centers around what we feel is the dangerous procedure of drilling an unprecedented number of wells through the aquafer. Both our files and yours contain incident reports of ground water pollution as a direct result of monitoring wells acting as a conduit of pollutants. This is dangerous to the very resource your agency is mandated to protect.

Further, we wonder if any of the Regional Water Quality Boards would have issued a drilling permit for a well down gradient from a potential pollutant site, such as a filling station? This is what these draft regulations is mandating. We are not being argumentative, the important thing today is the protection of our ground water through the PROPER monitoring of underground tanks.

We are quick to acknowledge the place of monitoring wells, but that place is only in an environment where there has already been a leak, as a measure of the extent of pollution...NOT AS AN ONGOING MONITORING DEVICE! Prior to the development of vapor monitoring technology wells were the only means of monitoring ground water pollution. TODAY POTENTIAL POLLUTION CAN BE DISCOVERED THROUGH VAPOR MONITORING and the horrendous damages of that pollution can be mitigated. Damages that could extend far beyond our precious ground water and into the body politic, if that pollution is trtansported through conduits mandated by an appointed government body.

Our fervent hope is that your board will amend your staff recommendations for such indiscriminate drilling of wells as outlined in the subject draft regulations and move into the new technological age with a strong emphasis on vapor monitoring.

With best regards,

FRANK H. WINSTON
Chairman and C.E.O.

FHW:r

encls.

TABLE OF CONTENTS

ABSTRACT

A study was undertaken to demonstrate the value of soil-gas measurements as an aid to determining the overall distribution of volatile contaminants in the subsurface. The study entailed three soil borings from the land surface down to a depth of a few feet below the water table and one transect of shallow (3.5 ft deep) soil-gas samples collected across a known plume of TCE in the groundwater. In the borings, soil gas and soil samples were collected a various intervals down to the water. Water samples were collected at the top of the water table. Depth to water in all four areas ranged from 25 ft to 30 ft. Two borings were over areas of known contaminat by CH_2Cl_2, F-113, TCA, TCE, and PCE. One boring was in a control area of no known contamination. In both borings over the contaminated areas, contamina from all the chemicals could be detected in the three ft to five ft depth range, and all concentrations increased down to the water table. At the cor area, only traces of the contaminants were detected in the soil gas and wate and no trends or gradients were evident. The trace amounts may in part have been due to equipment contamination from measurements at the previous two sites. Samples at the shallow soil-gas transect were collected through 1/2- steel pipes driven into the ground by hand. TCE was detected in the soil ga at all sites above the plume and not detected in the uncontaminated areas or both sides of the plume. All measurements were made in the field by gas chromatography. The equipment is capable of measuring two samples of air o water every eight minutes. The detection limits for most contaminants is about 0.001 µg/L in air and 0.1 µL/L in water.

In conclusion the soil-gas sampling coupled with the rapid field analysi appears to have good potential as a tool to aid in rapidly defining the distribution of subsurface contamination by volatile organic compounds.

INTRODUCTION

The purpose of this work is to demonstrate the value of soil-gas measurements in studies of subsurface contamination by volatile organic contaminants. Virtually all industrial chemicals used as solvents that have become groundwater contaminants are present to varying degrees in the soil gas as well as in the groundwater by virtue of their high vapor pressure and low aqueous solubility. Measurement of the contaminants in the soil gas provides information about the overall subsurface distribution that is normally overlooked in most contaminant investigations. In additic the soil-gas sampling technique is normally faster than groundwater samplin because soil gas is normally more accessable than the groundwater itself. Consequently, soil-gas sampling may function as a remote sensing technique to delineate groundwater contamination.

In this work, four sites were investigated on the Plant property. At Sites 1 and 2 contaminant profiles were measured in the soil gas down thro the unsaturated zone to, and including, the groundwater. The purpose of the study at these sites was to show the relationship or the distribution of the contaminants between the soil gas and the groundwater in areas of known groundwater contamination. The third site at a location upgradient from the contamination was selected as a control to show soil-gas distribution at an uncontaminated site. The fourth site consisted of a transect of shallow (3.5 ft deep) soil-gas samples collected across a small plume of TCE contaminated groundwater. This site was selected to test the ability of the method to locate contaminated groundwater by means of shallow soil-gas measurements. The results of the investigation at each site are discussed individually in the following sections. The investigation at Site 1 was

performed on June 23, 1983. The investigations at Sites 2, 3, and 4 were performed on the following day, June 24, 1983.

SAMPLING PROCEDURE

Gas samples from Sites 1, 2, and 3 were collected through a drive-poi screen attached to 1-1/4 inch pipe. A bore hole was advanced to the desir depth with a hollow flight auger. A soil sample was collected with a spli spoon driven approximately 18 inches through the open end of the auger int undisturbed soil. After withdrawing the split spoon, a hole approximately 1-1/2 inches in diameter remained. The drive point was inserted into the hole left by the split spoon and the auger was reversed to drop the cuttin above the top of the drive-point screen. The cuttings were tamped down making a seal of 6 to 12 inches of packed soil above the screen. A glass flow-through sample bottle having a valve at each end and a septum seal fo syringe access was placed in line between the 1-1/4 inch soil-gas pipe and a vacuum pump used to withdraw soil gas. Soil gas was pumped for two minu then the glass sample bottle was sealed and removed from the line for imme analysis in the field.

Water samples were collected from the same bore holes by lowering a b through the hollow stem of the auger immediately after the auger intercept water. The water samples were bottled, then analyzed in the field.

The shallow soil-gas samples collected in the transect along the park lot at Building 10 were collected through small pipes (1/2 inch X 4 feet) into the ground by hand. Soil gas was pumped from the pipe by means of a peristaltic pump for a period of 30 seconds. The soil gas was sampled fro the pump line directly with a glass syringe and injected into the gas chro in the field. The field analytical equipment was capable of measuring two

of air or water every eight minutes. The detection limit for all of the compounds measured except CH_2Cl_2 were 0.001 µg/L in air and 0.1 µg/L in water. The detection limits for CH_2Cl_2 were 0.01 µg/L and 1.0 µg/L in a and water, respectively.

RESULTS AND DISCUSSION

SITE 1

The results from all of the analyses at Site 1 are given in Table 1 The confidence intervals shown represent one standard deviation. In the of the above-ground air samples, the large standard deviation is due to fact that some of the samples were collected in the morning and some in late afternoon. The large deviations represent changes in air quality probably attributable to chemical vapor releases in the surrounding area The highest values were measured in the late afternoon.

The chemical concentrations in the above-ground air are higher than the soil gas of the top few feet. This suggests that the atmospheric ch concentrations presented here are not representative of the long-term av because the atmospheric gases can permeate quite readily through the upp few feet of soil given a time frame of a week or more.

All of the contaminants, without exception, increase in concentrati downward in the soil This distribution demonstrates unequivocally that there is a subsurface source of the chemicals. The depth to the water t at this site was 25 ft. With the exception of TCE, all of the chemical concentrations (mass per unit volume of gas or liquid) are higher in the soil gas than in the groundwater. As an aide to understanding the inter the field data, the behavior or distribution of each chemical in a simp gas-liquid system must be known. This parameter is known as the gas/li distribution coefficient. This coefficient is simply a measure of the

TABLE 1. Chemical Data for Site 1.

SAMPLE	CH_2Cl_2	F-113	TCA	TCE	PCE
Air above Ground (5)[a]	0.7 ± 0.6[b]	0.08 ± 0.07	0.01 ± 0.01	(<0.001)[c]	0.002 ± 0
Soil Gas 2 ft (1)	0.1	0.004	0.003	0.003	0.002
Soil Gas 3.5 ft (1)	3	0.3	0.03	0.01	(<0.00
Soil Gas 11 ft (2)	340 ± 33	33 ± 3	0.6 ± 0.3	0.4 ± 0.3	-
Soil Gas 14 ft (2)	11,000 ± 40	1700 ± 140	11 ± 4	2 ± 0.7	23
Soil Gas 20 ft (2)	12,000 ± 1300	1800 ± 360	13 ± 2	3 ± 0.5	23
Water (5) (Field Meas.)	1500 ± 150	81 ± 26	12 ± 2	16 ± 8	15
Water (HLA Lab Analysis)		95	12	27	

[a] (5) number of samples analyzed.

[b] All analyses expressed as µg/L of gas or liquid, confidence limits are one standard deviation.

[c] Parantheses indicate "none detected".

concentration ratio of the chemical at equilibrium in a closed system containing only water and air. These ratios were measured in this study for the compounds of interest, and are listed in Table 2. The distribution ratio varies with temperature but is independent of concentration at values below the solubility limit for the chemical. This value is generally proportional to aqueous solubility for a nonpolar compound that does not react with water.

Several points can be noted with regard to the contaminant distribution at Site 1:

1) The relative proportions of compounds in the gas phase correspond roughl to predictions based on the gas-liquid partitioning coefficients. The least soluble contaminant, F-113, shows the greatest proportion in the gas phase and the most soluble, TCE, has partitioned the least into the gas phase. Thus aqueous solubility is probably a major factor effecting the gas-liquid distribution of the chemicals observed at Site 1.

2) The soil-gas concentrations are not in equilibrium with the groundwater concentrations, and with the exception of TCE, the gradient favors more transfer from the soil gas to the groundwater.

3) Depending on the depth distribution of contamination below the water table, the proponderence of the CH_2Cl_2 and F-113 is likely to still exist in the soil gas. More groundwater measurements with depth are needed to ver this point.

SITE 2

Soil-gas measurements at Site 2 (depth to water, 23 ft) also showed contaminant concentrations increasing downward into the soil (Table 3). And like at Site 1, indicate a subsurface source for the contaminants. However, unlike Site 1, the concentration gradient across the water table soil-gas

TABLE 2. Concentration ratio for contaminants at equilibrium in an air-wat system at 25°C.

COMPOUND	$C_{AIR} : C_{H_2O}$
CH_2Cl_2	2.7 : 1
F-113	4 : 1
TCA	1 : 2
TCE	1 : 3
PCE	1 : 2.3

TABLE 3. Chemical Data for Site 2.

SAMPLE	CH_2CL_2	F-113	TCA	TCE	PCE
Air above Ground (1)	0.1	0.2	(<0.001)	(<0.001)	(<0.001)
Soil Gas 5 ft (4)	1.5 ± 0.8	3.5 ± 0.1	0.14 ± 0.08	0.01 ± 0	0.45 ± 0.2
Soil Gas 15 ft (2)	170 ± 23	71 ± 6	2 ± 1	0.60 ± 0.14	5.0 ± 0
Soil Gas 20 ft (4)	190 ± 100	100 ± 32	4.0 ± 1.8	0.9 ± 0.1	6 ± 6
Water (Field Meas.)	29 ± 5	65 ± 13	120 ± 29	0.6 ± 0.3	0.1 ± 0.1
Water (HLA Lab Analysis)		70	100	0.50	

interface indicates that F-113 and TCA are moving from the water into the soil gas whereas the remainder have the opposite gradient and thus are mov from the soil gas into the water.

The only speculation that might be appropriate from the data at Site is that contaminants may have been introduced into the subsurface at diffe times or places. The distribution of compounds relative to each other is clearly not directly a function of their solubility characteristics as app to be the case at Site 1. If they had all been introduced at once in the same system, the differences in their distribution should vary more predic as a function of their physical properties. However, at Site 2 the distri cannot be so simply explained suggesting that other variables, both tempor or spatial, may be involved. More groundwater samples will have to be collected at depth to determine if the major mass of contamination is abo or below the water at Site 2.

SITE 3

Site 3 (depth to water, 24 ft) is located at a point upgradient from the contamination at the Plant. The purpose of the investigation at this site was to show what the soil-gas data looked like in an area where there was no contamination. The results are given in Table 4. Only two gas sam were analyzed from this site because one or two attempts to collect gas fa due to clogging of the drive-point screen in the soil.

The results show only traces of contaminants and no trends or gradien are evident. In fact the trace levels of chemicals observed at this Site probably represent carryover or equipment contamination from the samples measured at the previous site where relatively high level contamination ex Only three gas bottles were on hand and each one had to be reused at each

TABLE 4. Chemical Data for Site 3.

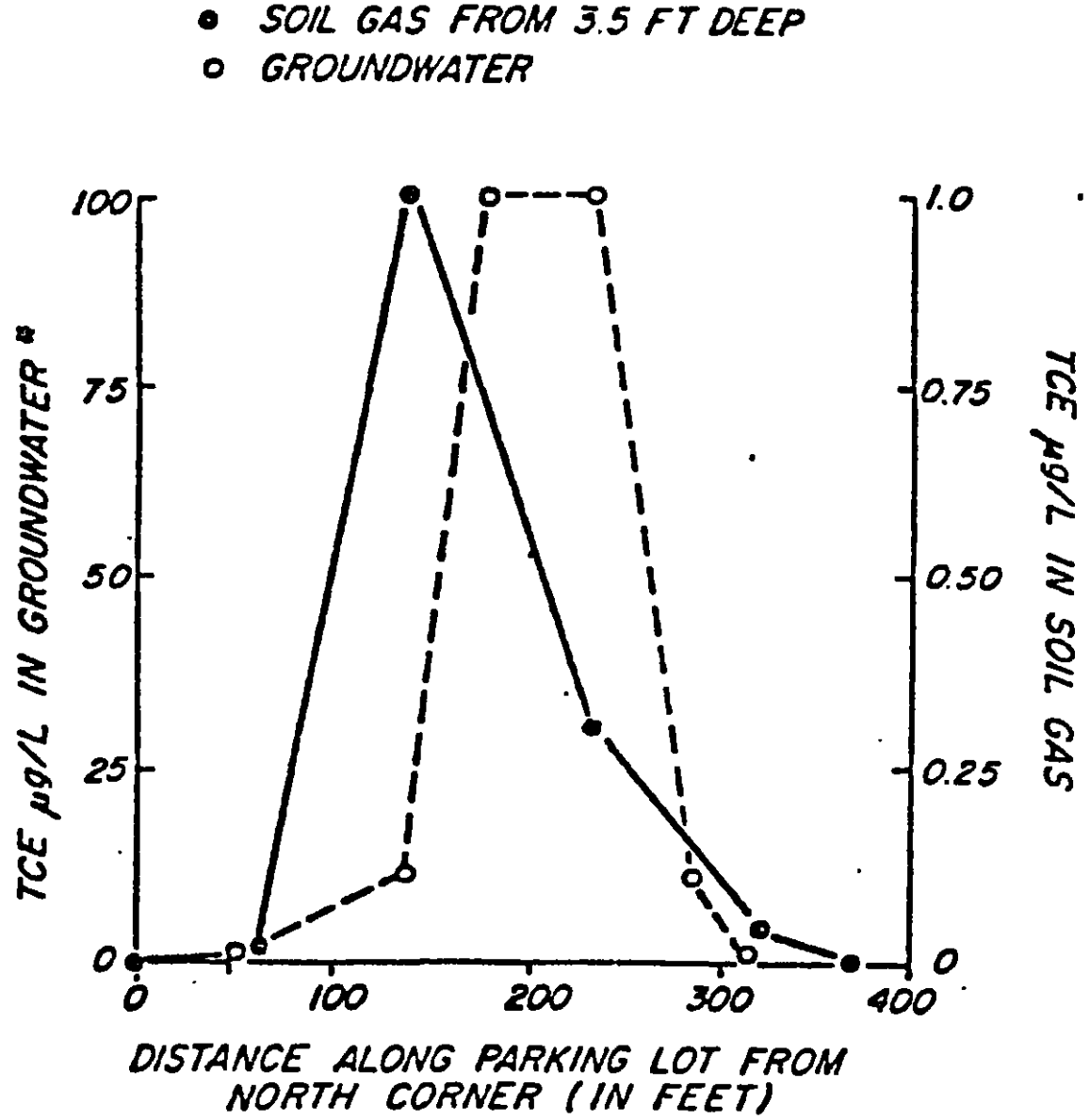
SAMPLE	CH_2Cl_2	F-113	TCA	TCE	PCE
Air above Ground (1)	0.1	0.004	0.003	(<0.001)	0.0
Soil Gas 10 ft (1)	0.02	0.04	0.003	0.001	0.0
Soil Gas 25 ft (2)	0.09 ± 0.01	0.01 ± 0.01	0.001 ± 0	0.001 ± 0.001	0.605 ±
Water (1) (Field Meas.)	(<1.0)	0.3	0.2	(<0.1)	0.
Water (HLA Lab Analysis)		ND	ND	ND	

Because this site investigation was started at the end of the last day there was no time to redo samples or make a special effort to clean the glassware or the sampling equipment before making the measurements. However, most of the concentrations observed here are two or more orders of magnitude lower than were observed at the contaminated sites and thus are not likely to crea misleading results on a typical production-oriented day. In order to get positive results near the detection limits, a system employing analysis of known blanks would have been used.

SITE 4

A transect of shallow soil-gas samples were collected at Site 4 across a known TCE plume where the depth to water was 30 ft. The results of all th gas analyses are presented in Table 5. A comparison of the TCE soil-gas data from this study with the groundwater TCE concentrations taken from a previous study are shown in Figure 1. The results show that TCE was detecte every place over the plume, and was not detected over the noncontaminated wa on both sides of the plume. However, the high concentration observed in the soil gas is not located exactly over the peak groundwater contamination area The soil-gas peak and the groundwater high are separated laterally by about 75 ft.

The fact that the soil-gas concentrations are not proportional to the groundwater concentrations is probably due to variations in the air permeability of the shallow soil. The soil at this site was particularly soft, requiring only two or three hammer blows (with a 10 lb sledge) per foo to drive the pipe. The soil at the point where the high concentration was measured was noticeably harder, thus contaminants at this point were probably better protected from dilution by atmospheric air.



*PREVIOUS STUDY BY HLA

FIGURE 1. Soil-gas transect across TCE plume.

TABLE 5. Shallow soil-gas transect across TCE plume at NE side of the parking lot.

Distance from North Corner of Parking Lot	CH_2Cl_2	F-113	TCA	TCE	PCE
#1 0 ft	0.06	0.006	0.001	(<0.001)	0.001
#2 65 ft*	0.02	0.05	1.0	0.01	0.004
#3 145 ft*	0.04	0.004	0.002	1.0	0.003
#4 236 ft*	0.04	0.01	0.003	0.3	(<0.001)
#5 325 ft*	0.02	0.3	2.0	0.03	0.002
#6 375 ft	(<0.01)	2.0	8.0	(<0.005)	0.04

* Sample location above previously determined TCE plume.

Soil-gas samples in this study were collected over a depth interval c 3.0 to 3.5 ft. In view of the ease of pounding pipe into the ground in th area, any subsequent study should be performed using longer pipe that may more definitive results. Ten ft lengths of pipe could have been used near as easily as the four ft lengths, and probably would have given more accur results. In this study, about 15 minutes was required at each transect location to drive the pipe, collect and analyze two samples, and remove th pipe.

EFFECTS DUE TO SOIL TYPE

As noted previously, soil samples were collected as part of the gas sampling process. The soil samples were examined in hand samples and the observations for each boring are shown in Figure 2. No correlation could be made between the shape of the soil-gas contaminant profile and the prop of the soil.

CONCLUSIONS

The techniques employed in this study or demonstration showed the following points:

1) Subsurface contamination by volatile contaminants produces a concentra gradient in the soil gas that decreases in a direction away from the majo source or body of contamination.

2) All of the groundwater contaminants in this study were detectable and distinguishable from atmospheric levels of the same contaminants at a soil depth of 3 to 5 ft.

3) A vertical profile of contaminant concentrations in the soil gas down through the unsaturated zone and in groundwater through contaminated portion of the aquifer is probably the most sensitive and rapid method of

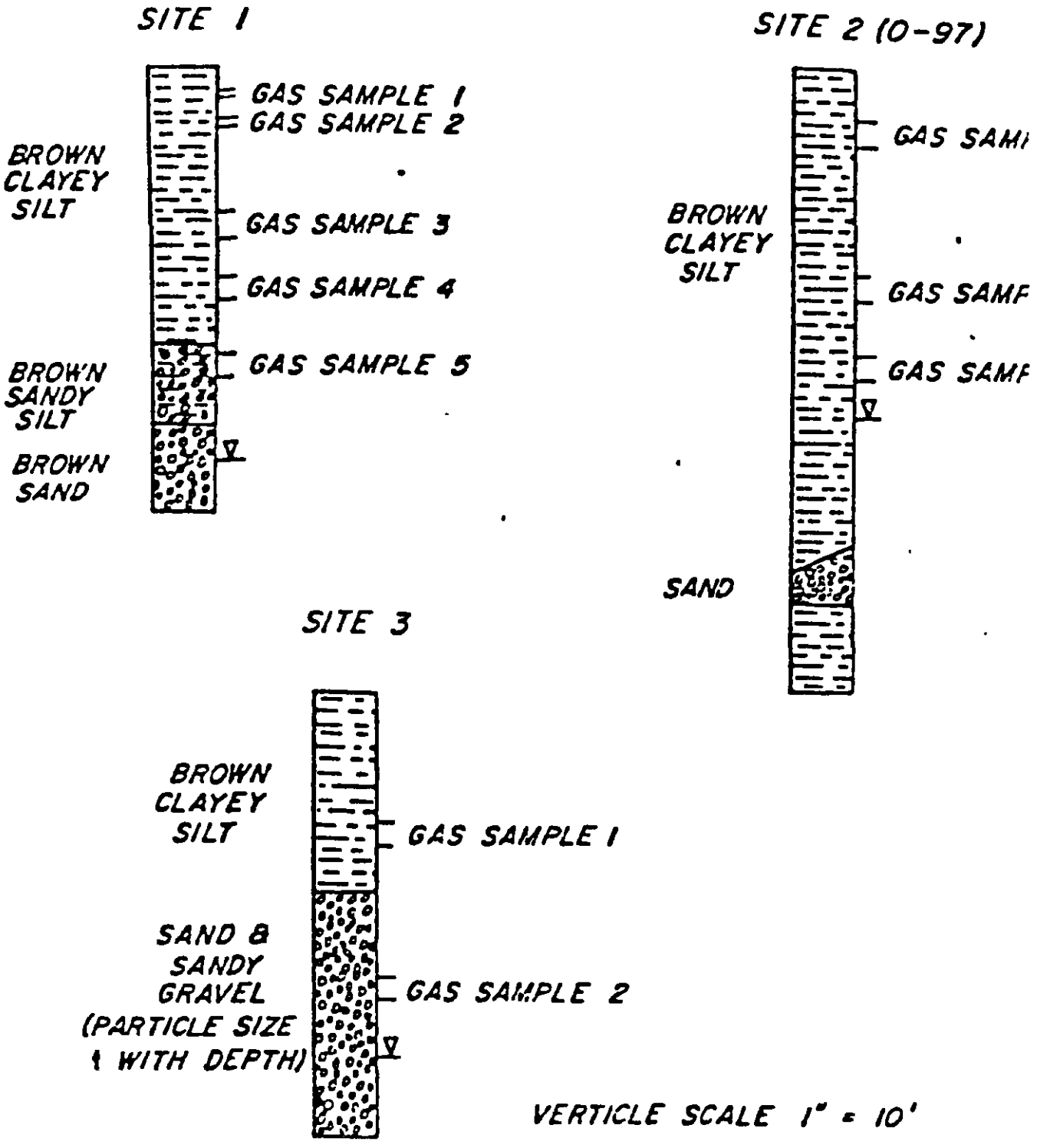


FIGURE 2. Soil Profiles at Sites 1, 2, and 3.

A MONITORING AND REMOVAL PROGRAM FOR LEAKED PROPANE GAS IN THE VADOSE (UNSATURATED) ZONE: A CASE STUDY*

Thomas Lobasso, Jr. and Andrew J. Barber
Geraghty & Miller, Inc., Syosset, New York

The loss of petroleum products through leaking tanks and distribution systems is one of the most common and widespread occurrences of subsurface contamination in the United States. Many of these incidences are spotlighted by the media and draw much public attention. Although many types of product recovery systems have evolved, earth scientists would agree that even the most advanced systems cannot remove all of the product trapped within the soil grains or rock fractures. Problems can occur due to lighter fractions separating from residual product, causing accumulations of vapors in the subsurface. Increased attention is being turned toward the role of gases in the unsaturated zone in incidents of hydrocarbon contamination. The following case history details the techniques used to delineate and remove a body of gaseous hydrocarbons from the unsaturated zone.

Field Investigation

Two leaks from a buried natural gas distribution system resulted in gas plumes under a residential area. The gas, predominantly propane, spread through an unsaturated zone composed of unconsolidated glacial materials and reach the water table where some of the gas dissolved in the ground water. Approximately one and a half years after the discovery and

*Proceedings from The Conference on the Characterization and Monitoring of the Vadose (Unsaturated) Zone: National Water Well Association: December 1983, Las Vegas, Nevada.

repair of the major leak, a subsurface investigation was begun utilizing specialized sampling procedures and protocols to determine the extent and dynamics of the plume in both the saturated and unsaturated zone. The results of the investigation revealed the second leak and were later used to design and implement a gas removal program.

A propane monitoring program in the vadose zone was initiated based on several assumptions; (1) propane has a greater density than air, 1.83 grams at 25°C and one atmosphere, and would migrate downward from the pipeline leak (4 feet below land surface) until it reached the saturated zone, (2) propane with an aqueous solubility of 65 mg/L (Merck, 1960), would dissolve into the ground-water system as the gas plume made contact with the water table, and (3) the remaining undissolved gas would blanket the water table surface. Presumably, propane gas can move in either direction between the saturated and unsaturated zones, depending on the relative concentrations in each zone.

Saturated Zone Investigation

A field investigation of the saturated zone was first undertaken to determine the extent of the dissolved propane in the ground-water system. The ground-water investigation, which continued concurrently with the investigation of the unsaturated zone, included the installation of monitoring wells designed to provide (1) geologic information, (2) ground-water samples to determine the impact of dissolved propane on the ground-water system and to approximate the location of the gaseous propane (undissolved) within the unsaturated zone, and (3) water levels to determine local hy-

draulic gradients and general direction of ground-water flow. Gas chromatographic analyses of ground-water samples collected from the monitoring wells indicated the general extent of propane contamination in the saturated zone. These results in turn provided the rationale for the location and design of gas monitoring wells in the unsaturated zone.

Unsaturated Zone Investigation

The investigation in the vadose zone began with the installation of 20 small-diameter wells screened directly above the water table. After samples of the soil atmosphere (soil-air samples) were collected and analyzed, it was apparent that additional monitoring points would be required to further define the extent of gaseous propane in the subsurface. Figure 1 shows the location of the propane-monitoring wells as well as the location of the gas-main leaks. To monitor the presence of gaseous propane vertically within the soil profile, well clusters (two or more adjacent wells screening successive depths) were installed at some of the locations. The vertical monitoring data was necessary to later maximize the removal of gas during the cleanup phase.

The monitoring wells were installed by the air rotary drilling method and were constructed of 2-inch (I.D.) PVC casing and screen. To install well casings and screens an oversize diameter borehole (6-inch) was first drilled. The drill cuttings were collected at 5-foot intervals and logged for geologic interpretation. Once the desired depths were reached, the well casing and screen was installed. The annular space surrounding the well screen was backfilled with graded sand slightly larger in grain size

Reference

Merck & Company, Inc., 1960; The Merck Index of Chemicals and Drugs, pp. 859.

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INDUSTRIAL
DESIGNS INC

October 22, 1984

State Of California
Water Resources Control Board
Division of Technical Services
901 P St.
Sacramento, Ca. 95814

Dear Sirs:

I would like to take this opportunity to commend those members of the Board actively engaged in writing the Regulations Draft. Efforts to safeguard the environment are long overdue.

There are several areas of pertinent technological advancements in which I have aquired expertise. For the past two years I have been investigating vadose vapor sensing technologies. Although my investigations centered on hardware develoopment, I have aquired significant insight into subsurface hydrocarbon transport phenomenon.

Attached are copies of four Investigations which are consistant in their findings. These investigations contain consistant data which will corroborate all stated comments.

The Investigations are:

1. "Soil Sentry Effectiveness in Controlled Soil Conditions"--- Advanced Industrial Designs Inc.
2. "A Monitoring and Removal Program for Leaked Propane Gas in the Vadose Zone"---
   Geriaghty and Miller
3. "Demonstration of Soil Gas Sampling as a Tool to Aid in Defining the Distribution of Subsurface Contamination by Volatile Organic Compounds"
   ---Glenn M. Thompson Ph.D.
4. " Soil Gas Studyof Volatile Organic Contaminents above a portion of the TCE Contaminated Aquifer"
   ---Dr. Glenn M. Thompson

Comments are referenced by the pertainent section number of the Draft Regulations.

2640,c
Expensive analytical and slant drilled samples of a site are not necessary. Vadose investigations would reveal accurate site history.

2642, f
A Leak of .05 gph should not be tolerated. The currently used test procedures are conducted over much too short a time span.

CONTINUED

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2644,a
Same comment as 2640,c
2645, b, 2
The five feet constraint on Vadose monitoring feasibility is not necessary. All investigations to date demonstrate that the effectiveness of aspirated Vadose monitoring systems increases as the water table rises. This increase is independent of soil composition.
2646, d
Same comments as 2645, b, 2

If I can be of any further service, please do not hesitate to contact me.

Sincerely,

Reinhard Hanselka
President and Principle Engineer

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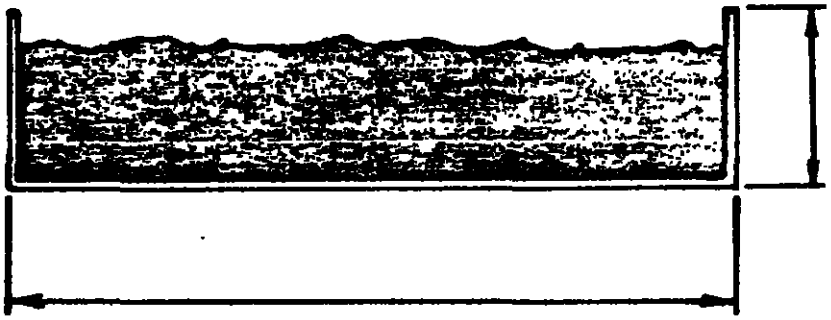
GENELCO

SOIL SENTRY

A. The purpose of this investigation is to determine the effectiveness of the device in a controlled soil condition.

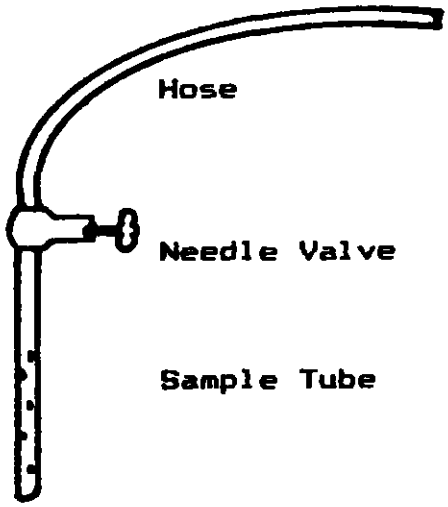
B. Apparatus and test procedure



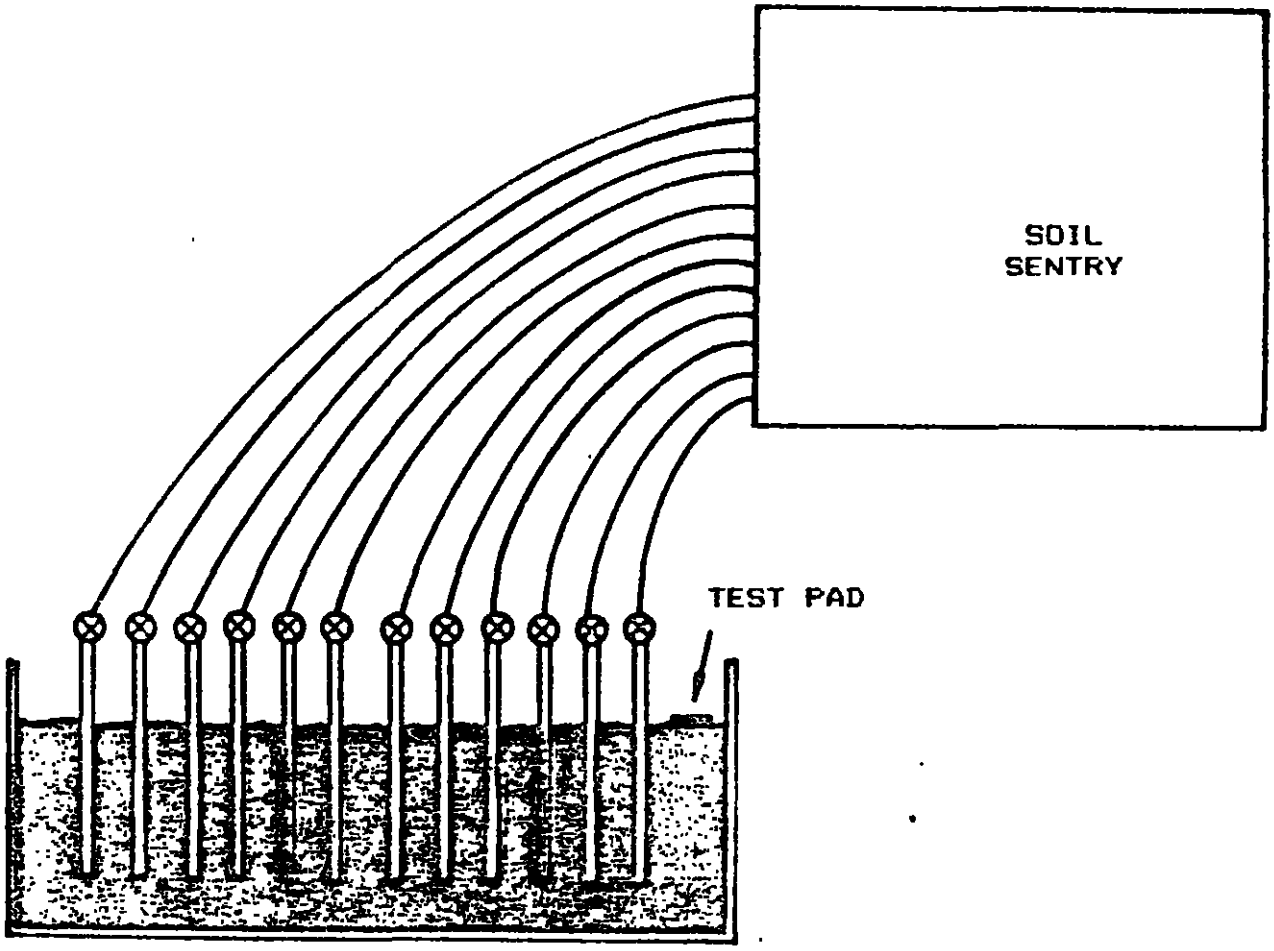
Test Box:

4' x 1' x 1'

5/8 plywood



C.



1. Soil

   a. 50% clay
      50% sand
         at 15% moisture
            50% moisture
               saturated at water table

2. Chemicals

   a. Acetone
   b. Gasoline (reg)
   c. Gasoline (unlead)
   d. Methylene Chloride
   e. Tri-chloroethylene (TCE)

3. Temperature

   45 deg. F - 78 deg. F

4. Procedure

   a. Soil was renewed after each chemical test.
   b. Sensor was initiated.
   c. 10 ml of test solution was placed on the test pad.
   d. Test completed when all sensors register leak or 5 days.

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5. Data

a. 15% moisture Acetone

Day 1 - Initiation & sample placement
Day 2 - Sensors 1, 2, 3, 4
Day 3 - Sensors 1, 2, 3, 4, 5, 6, 7
Day 4 - Sensors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Day 5 - -------

b. 50% moisture Acetone

Day 1 - Initiation
Day 2 - Sensors - all
Day 3 - -------
Day 4 - -------
Day 5 - -------

c. 15% moisture Gasoline (reg)

Day 1 - Initiation
Day 2 - Sensors 1, 2, 3
Day 3 - Sensors 1, 2, 3, 4, 5, 6, 7
Day 4 - Sensors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Day 5 - -------

d. 50% moisture Gasoline (reg)

Day 1 - Initiation
Day 2 - Sensors 1, 2, 3, 4
Day 3 - Sensors 1, 2, 3, 4, 5, 6, 7,
Day 4 - Sensors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Day 5 - -------

e. 15% moisture Gasoline (unlead)

Day 1 - Initiation
Day 2 - Sensors 1, 2, 3
Day 3 - Sensors 1, 2, 3, 4, 5, 6, 7
Day 4 - Sensors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Day 5 - -------

f. 50% moisture Gasoline (unlead)

Day 1 - Initiation
Day 2 - Sensors 1, 2, 3, 4, 5
Day 3 - Sensors 1, 2, 3, 4, 5, 6, 7
Day 4 - Sensors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Day 5 - -------

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g. 15% moisture — Methylene Chloride

Day 1 - Initiation
Day 2 - Sensors 1, 2, 3, 4
Day 3 - Sensors 1, 2, 3, 4, 5, 6, 7
Day 4 - Sensors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
Day 5 - Sensors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

h. 50% moisture — Methylene Chloride

Day 1 - Initiation
Day 2 - Sensors 1, 2, 3, 4, 5
Day 3 - Sensors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Day 4 - Sensors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Day 5 - -------

i. 15% moisture — TCE

Day 1 - Initiation
Day 2 - Sensors 1, 2, 3, 4
Day 3 - Sensors 1, 2, 3, 4, 5, 6, 7
Day 4 - Sensors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Day 5 - Sensors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

j. Sample tube material was changed from PVC to PVDF due to compatability problems with Methylene Chloride.

k. Water table saturated — Gasoline (unleaded)

Day 1 - Initiation
Day 2 - Sensors 1, 2, 3, 4
Day 3 - Sensors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Day 4 - -------
Day 5 - -------

6. Conclusion

Device performed as claimed. Sensitivity was equal with all solvents triggering response.

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SOIL GAS STUDY OF VOLATILE ORGANIC CONTAMINANTS ABOVE A PORTION OF THE TCE CONTAMINATED AQUIFER IN THE SOUTHWEST PART OF TUCSON, ARIZONA

By

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KIRK THOMSON

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UNIVERSITY OF ARIZONA
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MARCH 8, 1983

ABSTRACT

An investigation of volatile organic contaminants in the unsaturated zone soil gas above a known TCE contamination plume was conducted in Tucson on February 2, 1983. The purpose of the study was to test soil gas sampling as an investigative technique for subsurface contamination problems and test methodology for performing gas sampling.

Halocarbons were measured in the atmosphere above ground, in the soil gas at depths of 10, 20, 50, and 90 ft below land surface, and in the groundwater at the site. Seven compounds were measured. TCE, CCl_4, PCE, and CCl_3H showed gradients that increased in concentration toward the water table, indicating a subsurface or water-table source. F-11, TCA, and methylene chloride showed decreasing concentration with depth indicating a possible atmospheric origin.

All of the compound detected in the soil gas at 10 ft were detected in the groundwater as well at 100 ft proving the basic value of the method for remote detection of groundwater contamination. If horizontal and vertical gradients are measured, the method can provide information about source and proximity of contamination.

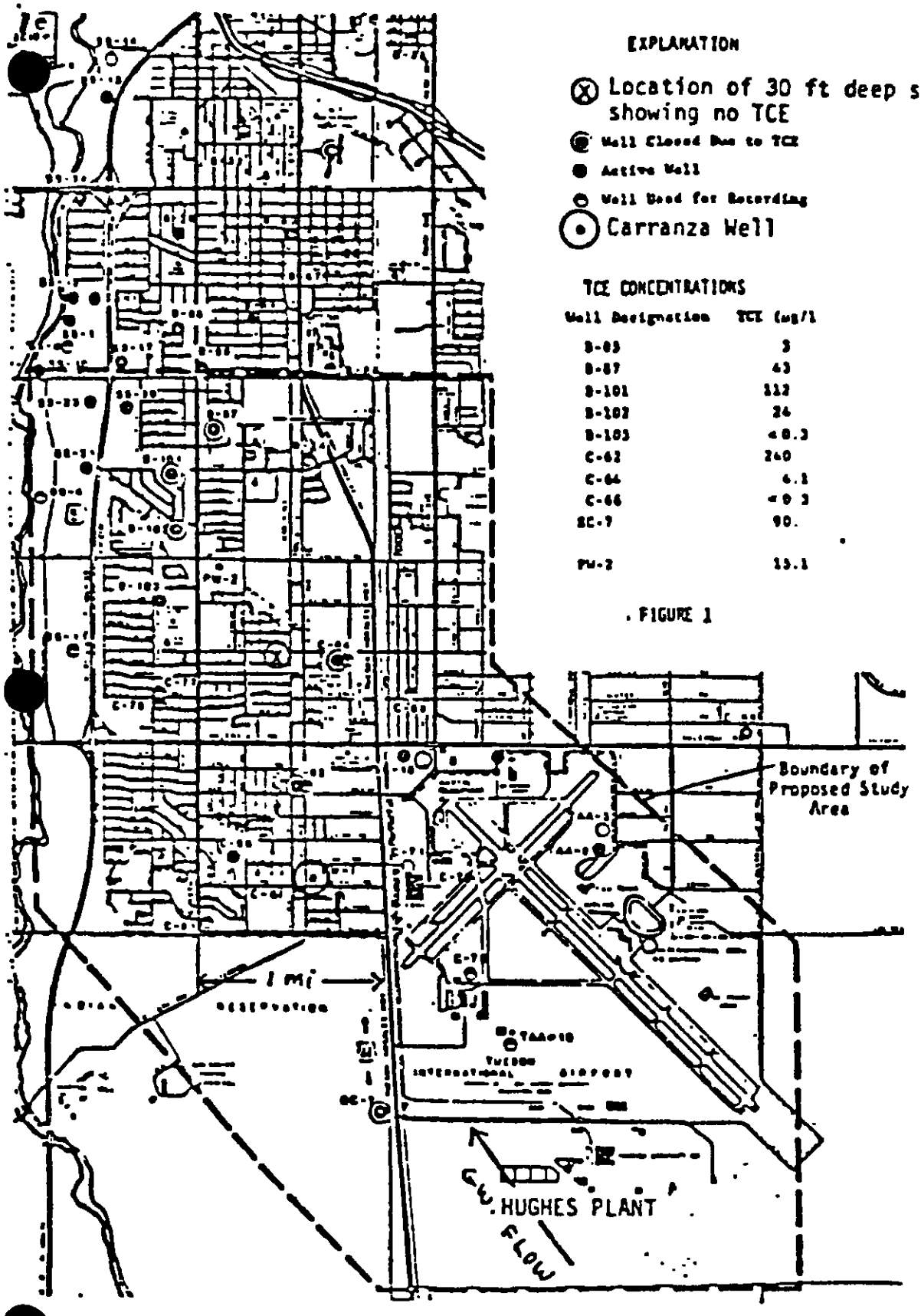


FIGURE 1

Figure 1. Map showing contaminated wells in southwest part of Tucson and locatic of study site (Carranza well) relative to Hughes Plant, a known source of TCE contamination in the groundwater.

An experiment to investigate the concentration of volatile halocarbons in the soil gas above a portion of the TCE contaminated Tucson aquifer was initiated on February 2, 1983. The purpose of the experiment was to learn what factors affect the soil-gas concentration of a contaminant emanating from the water table and to evaluate methods of sampling the soil gas and groundwater. Soil-gas sampling is potentially the best investigative technique for volatile organic compounds in groundwater because of the low cost and speed of the measurement in comparison to drilling to the water table for each data point.

LOCATION

The site is located at the Carranza residence at 7019 South 6th Street in Tucson. The property is directly downgradient (northwest) of the Hughes Aircra Company plant (Figures 1 and 2) which is known to be a major source of TCE contamination in the groundwater. There is a domestic well on the property contaminated with over 500 ppb of TCE indicating that the Carranza property is over the contaminated groundwater plume. Because of the proximity of the site to the contamination source, it is logical that the TCE has moved under the study area with the groundwater flow and has diffused upward from the wate table through the soil in the gas phase.

FIELD SAMPLING METHOD

Soil gas is collected from a drive-point screen driven or buried in the ground at the desired depth. The gas is collected by pumping the soil gas out of the ground and through a sample container by means of a vacuum pump (Figure

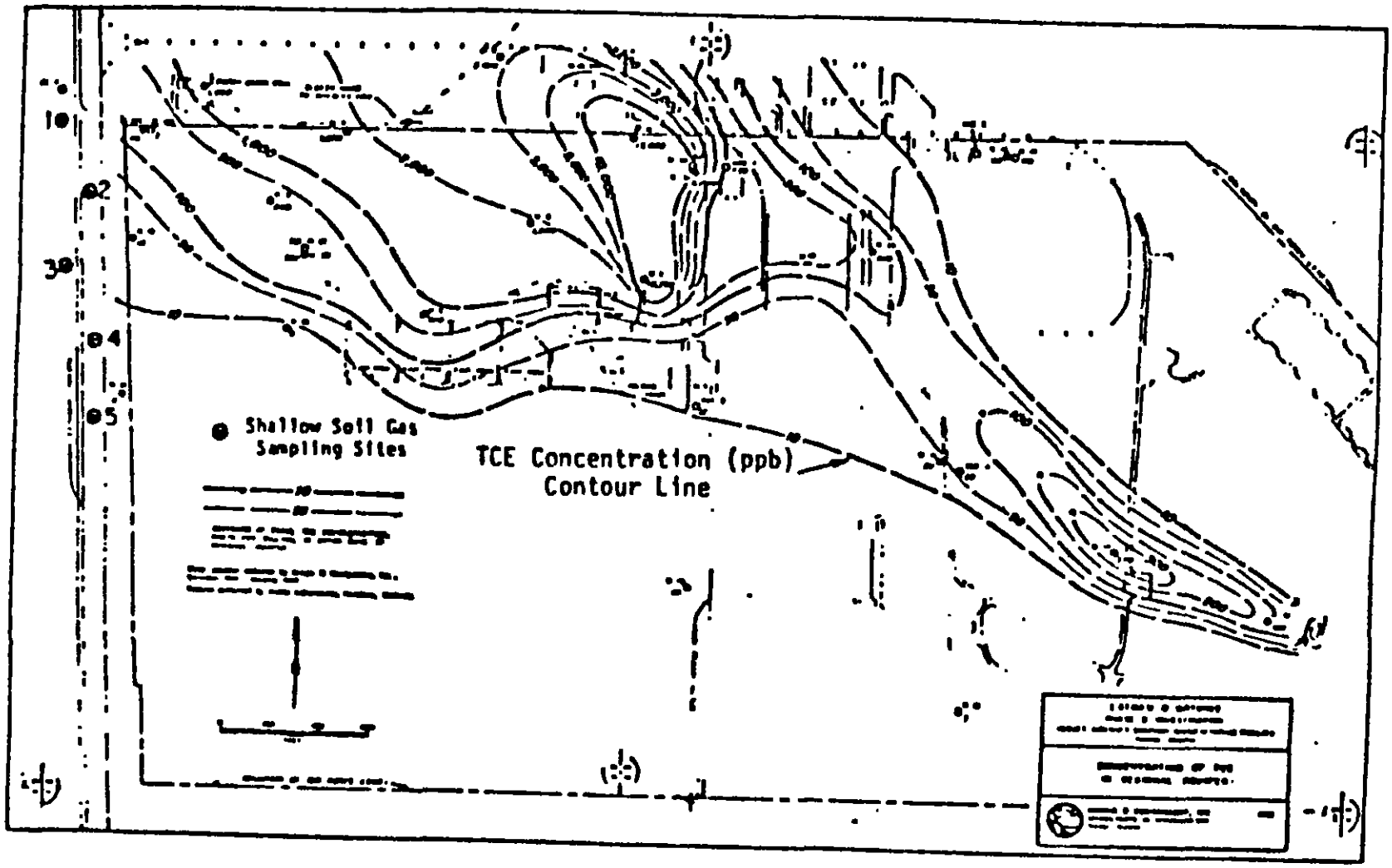


Figure 2. Map showing TCE plume originating from Hughes Plant.

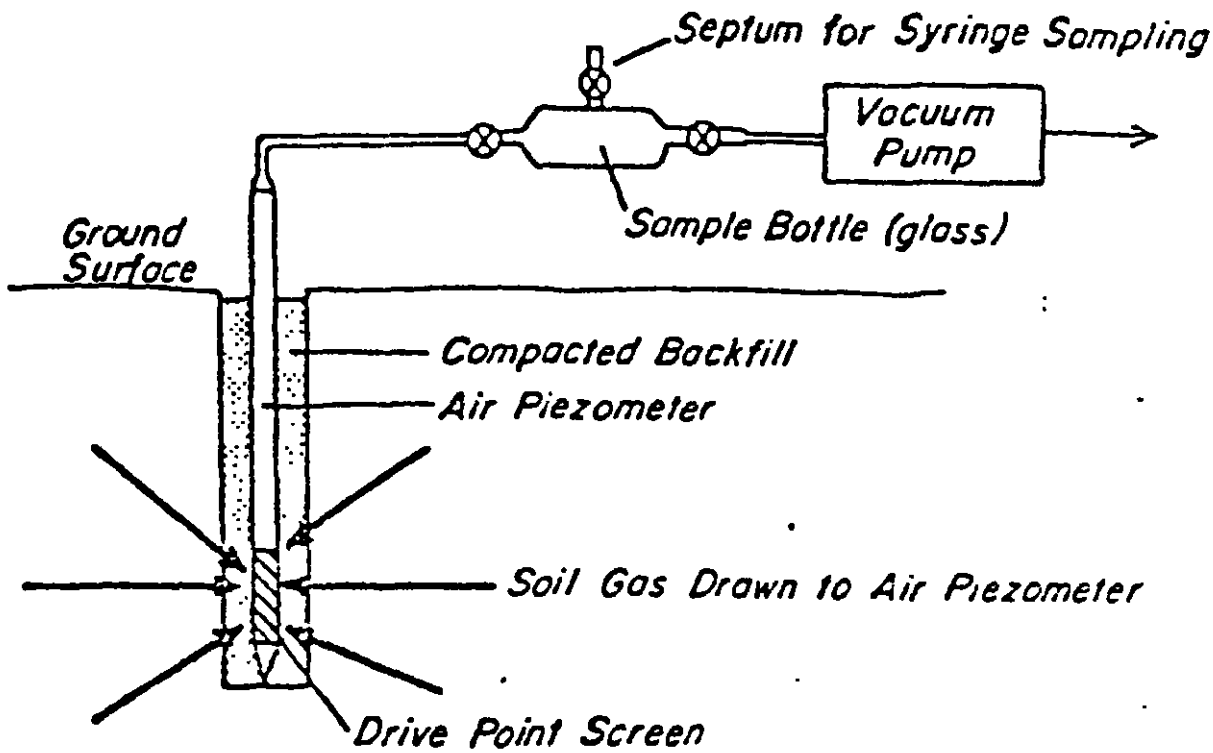


Figure 3. Schematic drawing of soil-gas sampling system.

A gas sample is periodically collected in a syringe from the sample bottle in the evacuation line and analyzed in the field. The field analysis is critical to the method in order to determine when a representative sample has been obtained and to direct the investigation as it progresses.

A hollow stem auger was used to drill the access hole. Soil-gas samples were collected at various depths through an air piezometer lowered down the center of the auger. Generally, the work proceeded as follows. The auger hole was advanced to the desired depth, and the air piezometer which consisted of a standard 30" drive-point screen on 1-1/4" steel pipe was lowered to the bottom of the hole and either driven with a 150 lb hammer or backfilled to bury the screen in the bottom of the hole. Burying the screen by driving it was initially assumed to be the best approach. This approach rarely worked, however. Oftentimes rocks prevented the screen from being driven more than a few inches. In the clayey soils where the screen would drive easily, no air could be drawn through the screen because all of the holes were effectively clogged with clay. In one instance where the screen was driven, the steel pipe broke while it was being pulled back out. The backfilling method was generally more successful. This entailed refilling the hole with drill cuttings to a depth of about five ft above the top of the screen, and pressing the soil down around the screen with the vertical hydraulic drive mechanism of the auger.

Water sampling was attempted with a positive displacement, low-volume sampling pump. The sampling pump which is 1.5 inches in diameter fit easily down the center of the auger flights. The pump, however, would not function properly in the extremely muddy water inside the auger tube. Essentially, the only water sample collected came up inside the drive-point sampler after it had

penetrated the top foot of the water table. This was considered to be the most important sample for this study because of our particular interest in collecting water from the top of the water-table surface.

After the piezometer was in place, the soil gas was pumped at 5 to 20 L/mi for a period of 30 to 50 minutes with analyses being made as frequently as possible during this period. The series of measurements were needed to determi if uncontaminated air was being drawn into the sample from above ground. If surface air is being drawn down the borehole, the contaminant concentration will show a decrease after about five minutes of pumping when the surface air reaches the piezometer screen. If there is no open connection to the surface, the concentrations will remain constant for at least 50 minutes of pumping. Two examples that illustrate the behavior described are given below:

SAMPLE A		SAMPLE B	
3.9×10^{-3} ug TCE/L	7 minutes	3.3×10^{-3} ug TCE/L	5 minutes
2.3×10^{-3} ug TCE/L	18 minutes	3.3×10^{-3} ug TCE/L	11 minutes
2.9×10^{-3} ug TCE/L	30 minutes	3.5×10^{-3} ug TCE/L	25 minutes
2.4×10^{-3} ug TCE/L	40 minutes	3.5×10^{-3} ug TCE/L	40 minutes
		3.4×10^{-3} ug TCE/L	55 minutes

Sample A, soil gas collected at a depth of 25 ft below ground shows air leakag down the borehole. Sample B, soil gas collected from a depth of 50 ft in the same location using the technique described above, represents a sample collect with no air leakage, thus the contaminant level remained nearly constant for t entire sampling period. This ability to know if air is being drawn from above is extremely important to the problem of collecting meaningful data in vadose gas sampling programs because undetected air leakage can easily cause 100% err in a sample measurement.

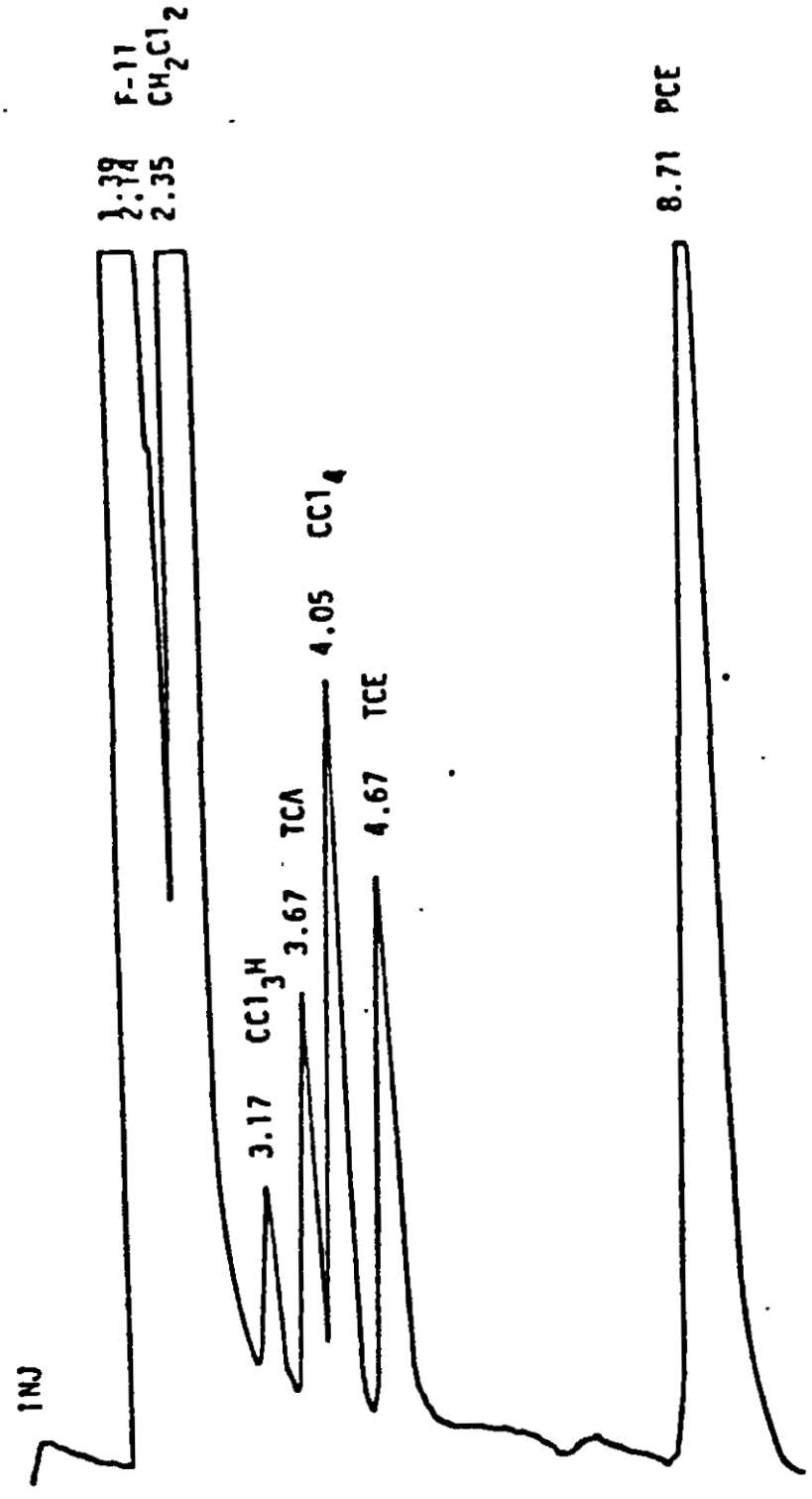


Figure 4. 2 cc soil gas from 25 ft horizon, 2/2/82, Carranza property.

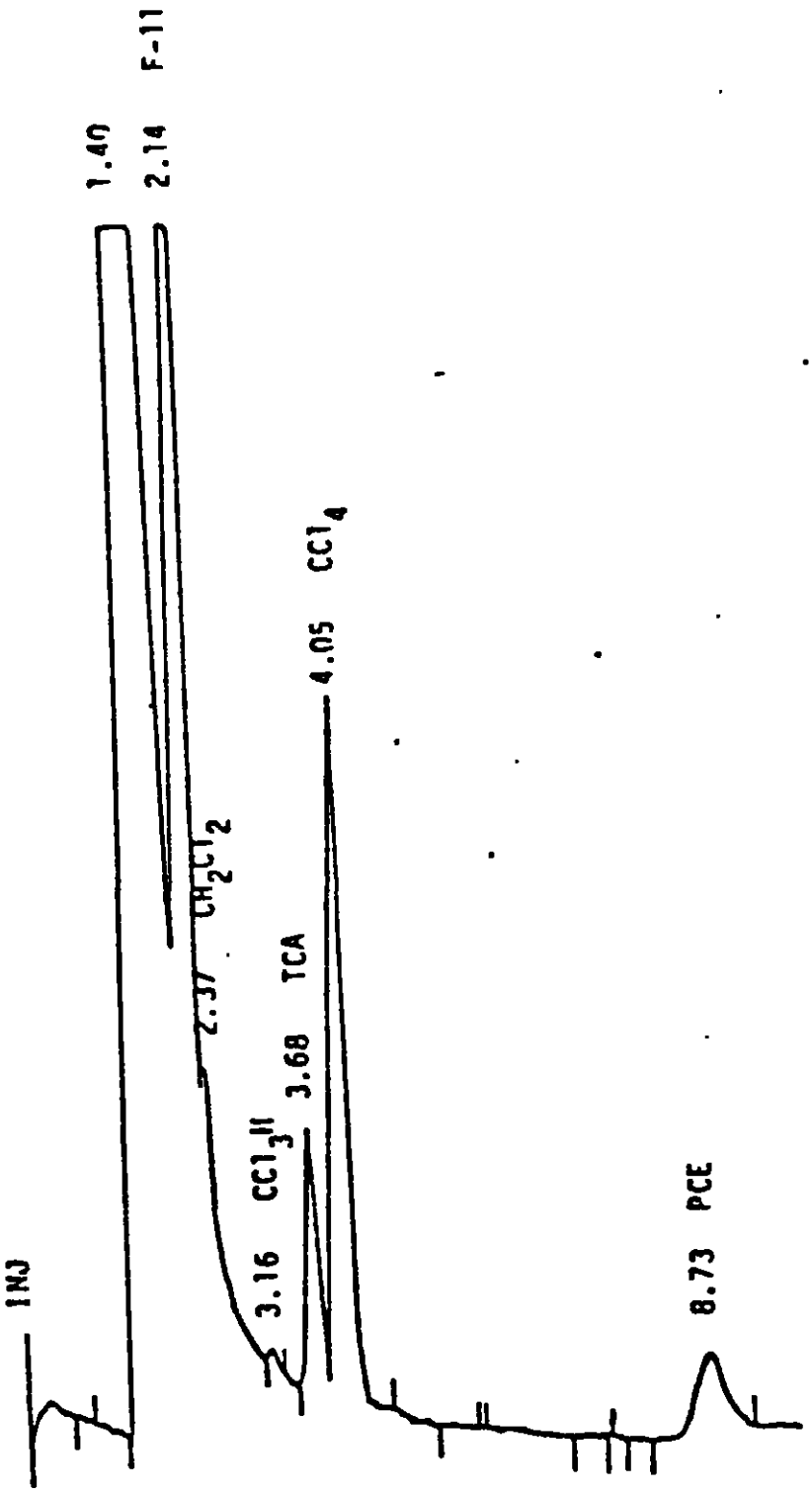


Figure 5. 2 cc air above ground, 2/2/83, Carranza property.

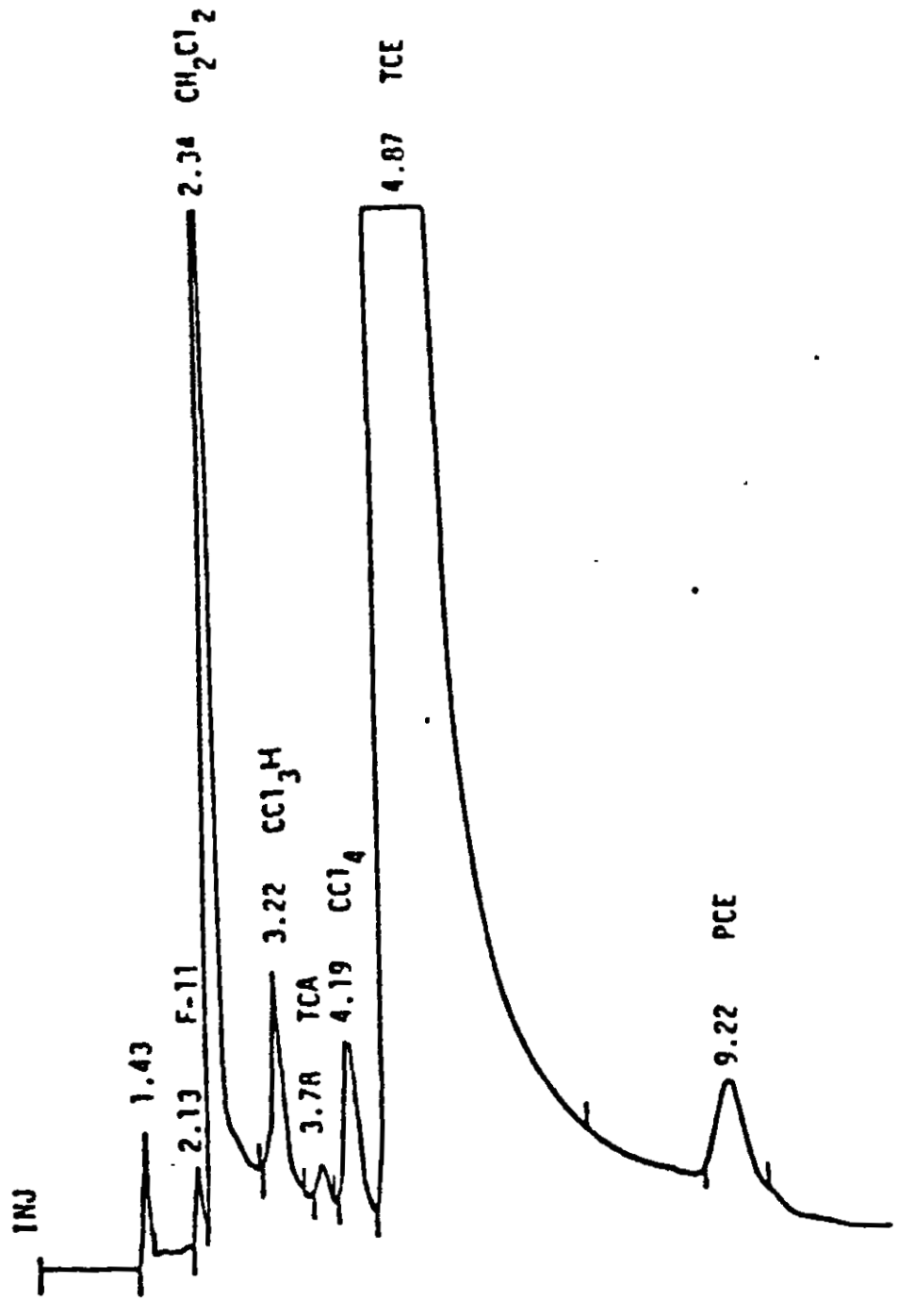


Figure 6. 5 uL water from Carranza well, 3/7/83.

RESULTS AND DISCUSSION

Seven compounds were identified in the soil gas and in groundwater. These were:

trichlorofluoromethane (F-11)
methylene chloride (CH_2Cl_2)
chloroform (CCl_3H)
1,1,1 trichloroethane (TCA)
carbon tetrachloride (CCl_4)
trichloroethylene (TCE)
perchloroethylene (PCE)

The approximate depth and concentration observed for these compounds in the soil gas and in the groundwater are given in Table 1.

In the case of CCl_3H, CCl_4, TCE and PCE, the concentration increased with depth down to the water table. For F-11, TCA, and CH_2Cl_2, the reverse trend was observed, the soil-gas concentration was greatest near the surface. The contamir concentration from two samples of groundwater is provided in Table 1. The first sample "water table surface" is water that was bailed from the first water to flow into the auger hole. The Carranza well is a domestic well (about 300 ft away) that intercepts approximately the upper six ft of the water table. Both samples are included for comparison. The "Carranza sample" is probably a better representative of the local water but the "water table" sample is probably a better sample for comparing relative concentrations of contaminants across the surface of the water table, i.e., the air-water partitioning coefficient undergr

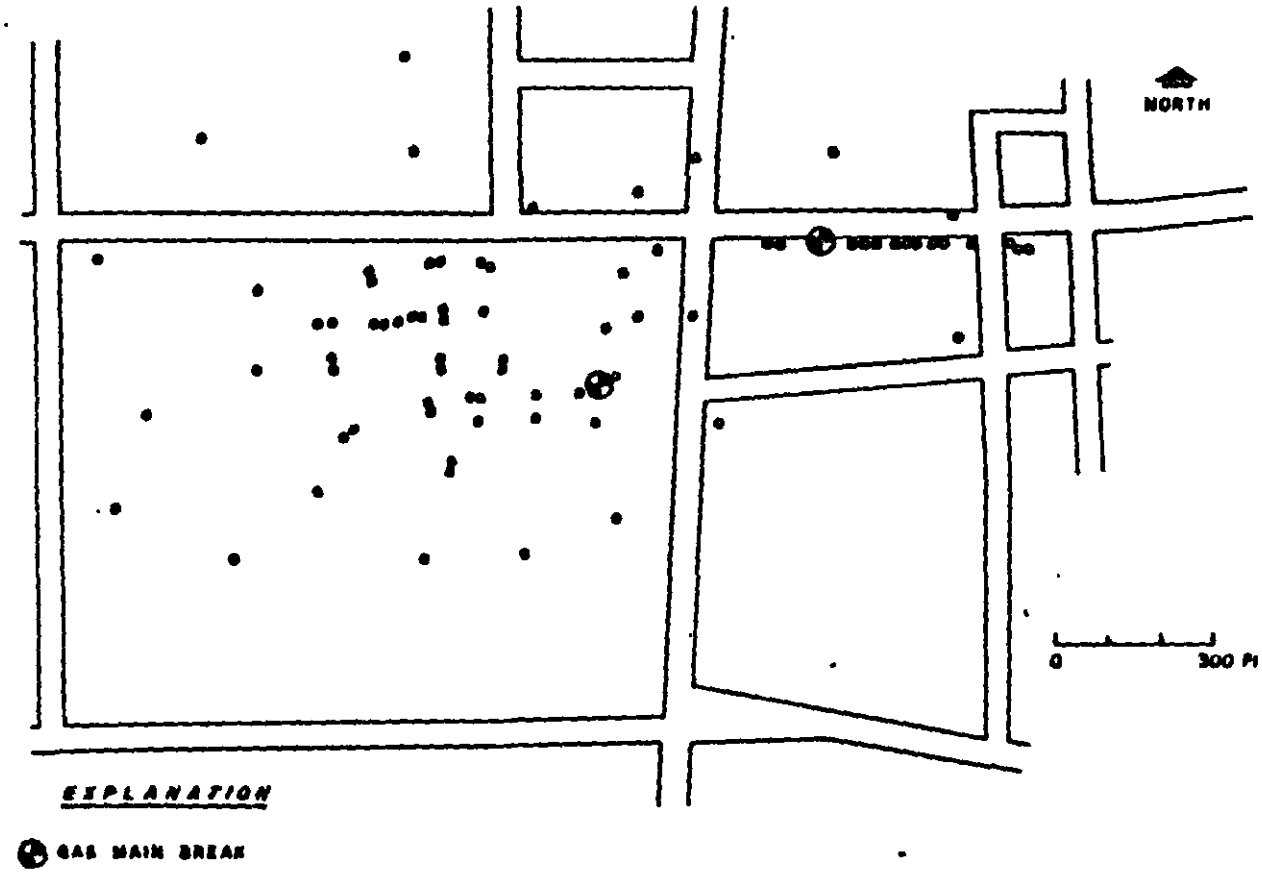
The data are most easily interpretable for TCE because the groundwater concentration is high enough to produce a strong gradient from the water table to the ground surface. There is no TCE in the atmosphere (free air) and the source is clearly from the groundwater. The partitioning coefficient, K_w

TABLE 1. Concentration data for atmospheric and subsurface halocarbons at the Carranza property, 7019 South 6th Avenue, Tucson, Arizona, February 2, 1983.

		F-11	CH_2Cl_2	CCl_3H	TCA	CCl_4	TCE	PCE
AIR ABOVE GROUND[a]		0.004	0.005	-	0.01	0.01	-	0.00
SOIL MATERIAL	SOIL GAS							
	10 ft	0.007	1	0.007	0.02	0.008	0.006	0.01
SILT, SAND GRAVEL	25 ft	0.006	0.2	0.009	0.01	0.009	0.02	0.04
	50 ft	0.005	0.1	0.03	0.001	0.09	0.03	1
CLAY								
	90 ft	0.004	0.08	0.3	0.001	2	9	5
SAND SILT CLAY								
WATER TABLE[b] SURFACE	100 ft	0.003	2	1	-	0.1	142	0.0
CARRANZA WELL	100 - 106 ft	0.009	6	1	0.1	0.2	558	0.2

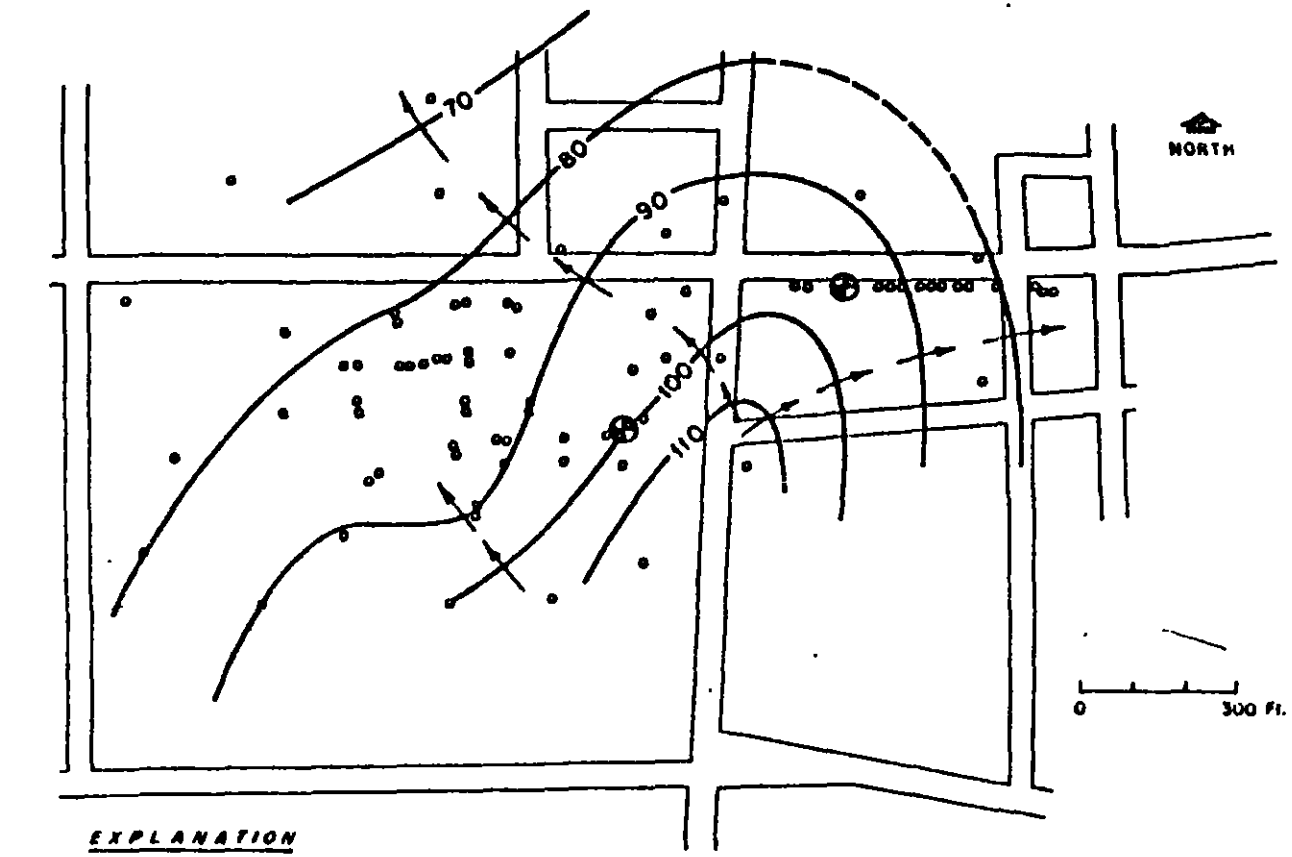
[a] Concentrations expressed in µg/L gas ± 20% (one standard deviation).

[b] Concentrations expressed in µg/L water ± 20%.



LOCATION OF PROPANE MONITORING WELLS

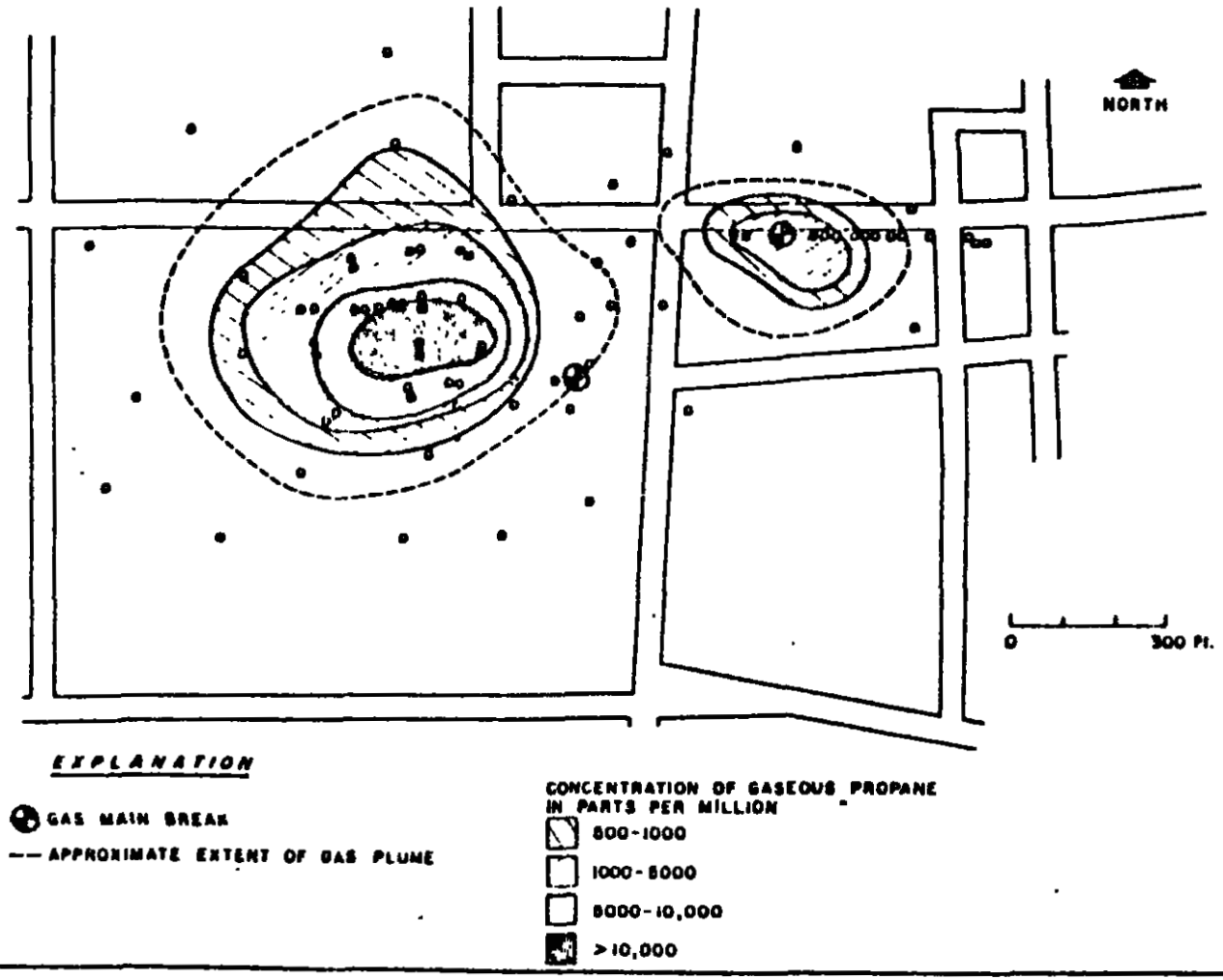
Figure 1



WATER TABLE CONTOURS

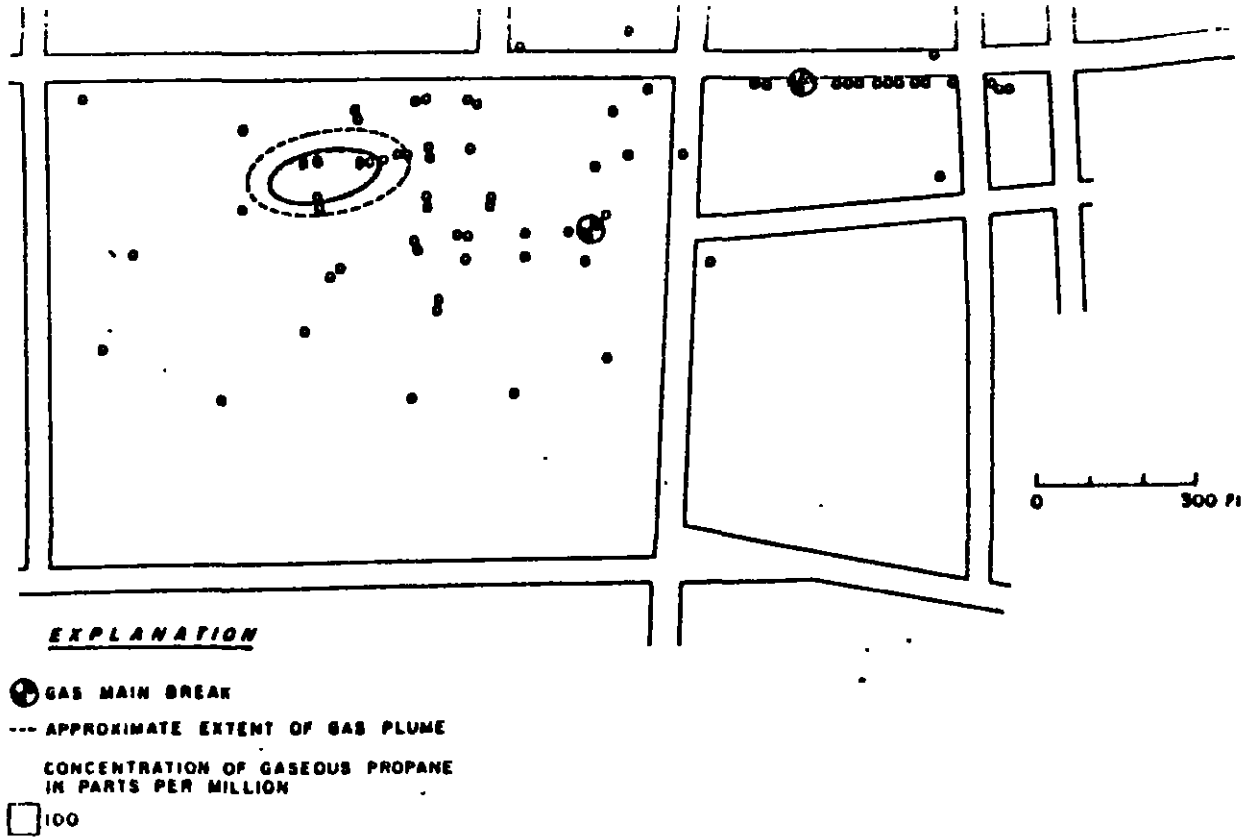
(Feet above mean sea level)

Figure 2



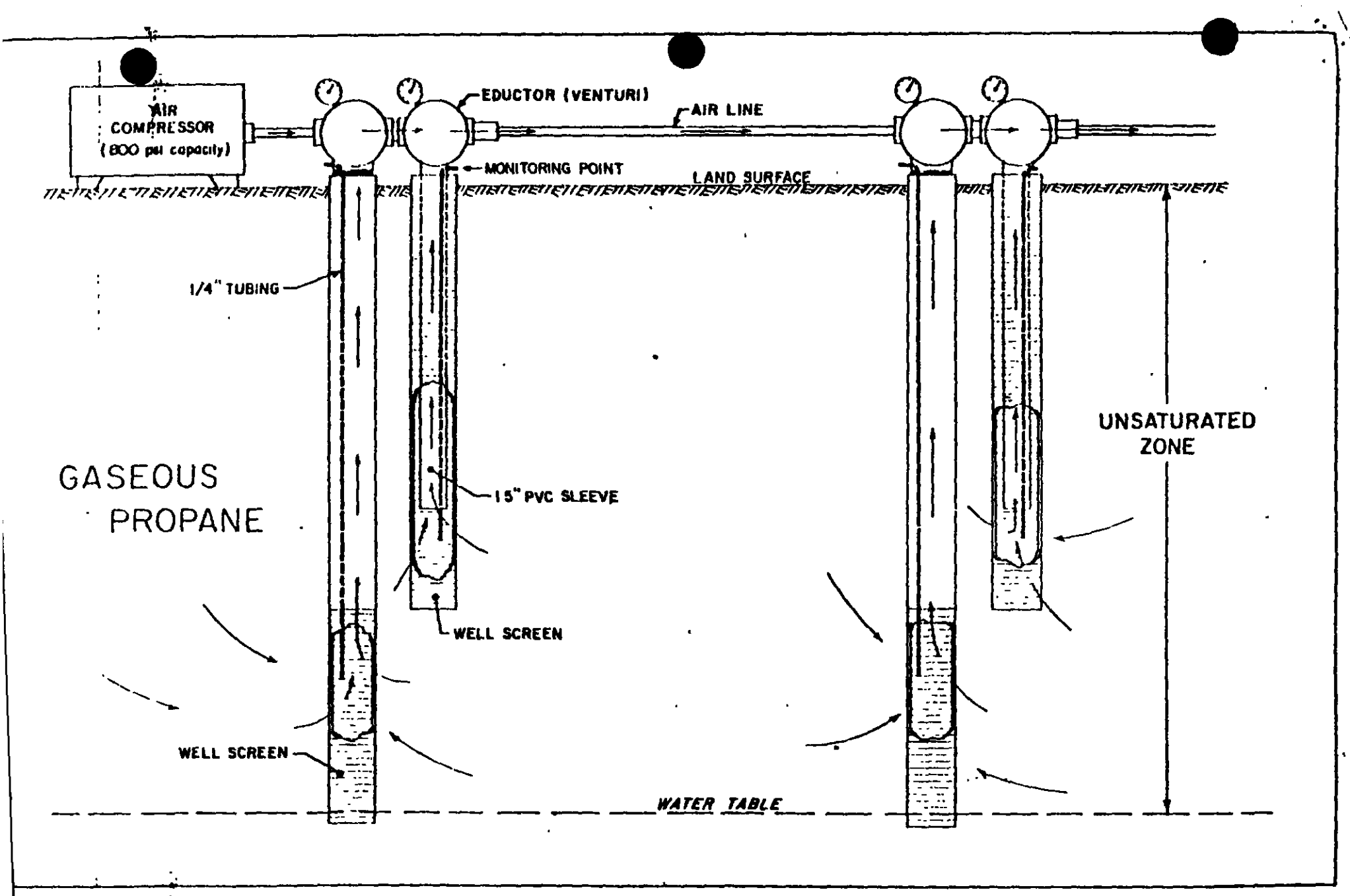
CONCENTRATION OF PROPANE IN THE MIDDLE TO LOWER UNSATURATED ZONE (15'-30')
(BEFORE GAS REMOVAL OPERATIONS)

Figure 3



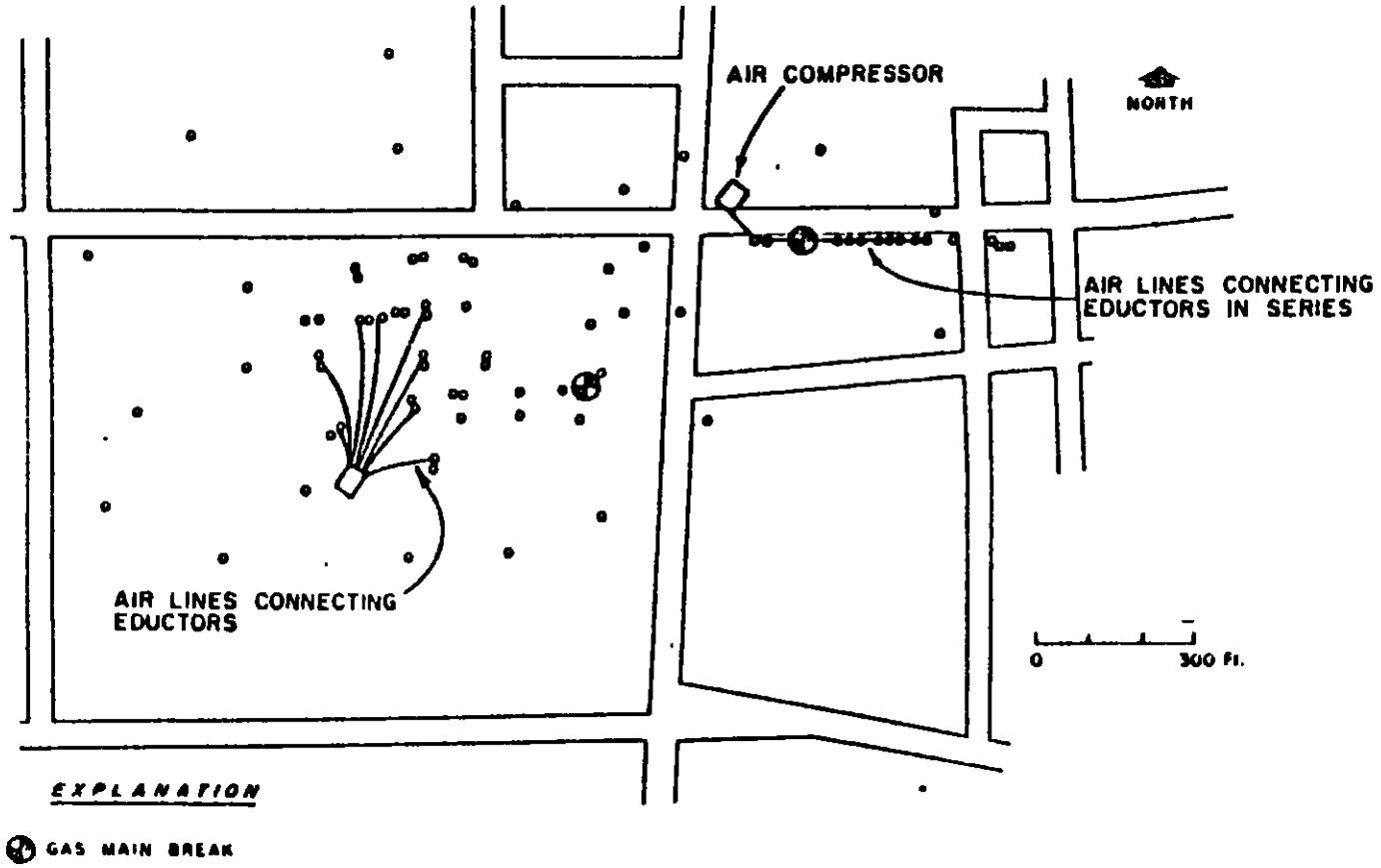
CONCENTRATION OF PROPANE IN THE UPPER TO MIDDLE UNSATURATED ZONE (0'–15')
(BEFORE GAS REMOVAL OPERATIONS)

Figure 4



CROSS-SECTIONAL VIEW OF PROPANE REMOVAL SYSTEM

Figure 5



TYPICAL AIR LINE CONFIGURATIONS USED DURING THE PROPANE REMOVAL PROGRAM

Figure 6

DEMONSTRATION OF SOIL-GAS SAMPLING AS A TOOL TO AID IN DEFINING THE DISTRIBUTION OF SUBSURFACE CONTAMINATION BY VOLATILE ORGANIC COMPOUNDS

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($K_w = \frac{\text{gas phase concentration}}{\text{aqueous concentration}}$), observed for TCE across the water-table surface is approximately 0.06. The equilibrium K_w measured in the laboratory in a sealed vessel containing only water and air is approximately 0.25. A lower K_w value would be expected in the field because of the problem of transporting the solute by diffusion through the aquifer material to the water-table surface where the gas-phase concentration is established. Thus equilibrium is probably never achieved, assuming that diffusion and escape through the unsaturated sediment is too rapid to allow the soil-gas concentrations to reach equilibrium above the water-table surface.

The other compounds that showed increasing concentration with depth in the unsaturated zone, chloroform, carbon tetrachloride, and PCE also appear to have a subsurface source. However, in these cases the groundwater concentration at the site appears not high enough to be the principal source for most of the gas observed in the soil. Lateral diffusion from a nearby higher contamination source is a more plausible explanation. Clearly, a horizontal gradient would have to be measured to determine if lateral diffusion was a principal factor in producing the gas concentrations observed. An influx of contaminated runoff into the subsurface from a nearby wash might also be a plausible explanation for the lower level contaminants observed at this site.

The F-11, TCl_4, and the methylene chloride showed decreasing concentrations with depth indicating an atmospheric source, yet the subsurface concentrations were higher than the concentrations in the atmosphere. This seemingly paradoxical situation occurs quite commonly for atmospheric halocarbons in the subsurface, often making their concentration in groundwater near recharge areas several times higher than would be expected for water in equilibrium with the atmosphere from which they are derived. This phenomena has been demonstrated by Russell and

Thompson (1983) to occur naturally as a result of sorption-desorption mechanis occurring in the three phase soil-water-air system. Even though the natural processes can be responsible for anomalously high halocarbon concentrations in groundwater, this mechanism should be invoked with caution in areas where subsurface dumping of contaminants has occurred.

CONCLUSIONS

In every case where halocarbons could be measured in the soil gas, they were detectable in the groundwater. In the case of TCE which showed high concentration in the groundwater, the soil-gas component appeared to be derived from the contaminated groundwater immediately below the sampling site. The groundwater appears to be the source because the concentration ratio measu between the soil gas and the water-table surface corresponded reasonably well to our expectations which are based on laboratory measurements of the gas/liqu partitioning coefficient, K_w.

For chloroform, carbon tetrachloride, and PCE, a subsurface source appear likely because the highest concentrations were measured near the water table but the groundwater immediately below the gas sampling location appears to be too low to be the main contributor of contaminants to the soil gas. Lateral movement in the gas phase from a nearby source could have produced the profile observed. More sampling locations along a horizontal transect would be needec to verify this hypothesis.

The ease of collecting soil-gas samples coupled with sensitivity of the measurement technique indicates that the gas sampling method will be useful in contaminant investigations. The method may provide a rapid survey techniq for determining the approximate areal extent of a subsurface contamination problem. If the vertical and horizontal soil-gas profiles can be developed.

All of the TCE measurements were made in the field using conventional laboratory equipment mounted in a vehicle and operated from a generator. A Varian 3700 series gas chromatograph and Hewlett Packard integrator were the principal equipment items. The gas chromatograph was modified with a Nafion tube dryer to remove water, thus allowing direct injection of either soil gas or water. The practical detection limit for TCE by this method is 0.1 µg/L in water or 1×10^{-4} µg/L in soil gas. The analysis time is the same for either water or soil gas typically taking about ten minutes if no more than five to ten compounds are present in the sample. Figures 4, 5, and 6 show representative chromatograms of soil gas, air, and groundwater, respectively.

considerable information about the source of contamination may also be derived. The soil-gas measurement at the very least could provide a far more effective substitute for conventional "soil sampling" as a technique for locating volatile contaminants in the unsaturated zone.

REFERENCES

Russell, A. D., and G. M. Thompson. 1983. "Mechanisms leasing to enrichment of atmospheric fluorocarbons CCl_3F and CCl_2F_2 in ground water." Water Resources Research, p 57, February.

than the screen openings (0.02 inches) to prevent fine soil particles from entering the well. The space directly above the screened interval was filled with bentonite clay and cement to seal the well and prevent surface runoff from entering.

One quarter-inch (I.D.) tubing was installed in each well which extended downward into the well screen approximately two-thirds the distance from ground surface to the water table. The tubing protruded through an air-tight well cap at ground surface and was used for collection of soil-air with vacuum equipment.

During early phases of the field investigation, it was necessary to have real-time analyses of hydrocarbon content in soil gases. The immediate results helped to guide the drilling program, and allowed us to establish a protocol for gas sampling once the wells were in place.

The two instruments used for this work were an organic vapor analyzer (OVA) and an explosimeter. The OVA is a portable instrument that can measure hydrocarbons in air in the range of 0.2-1,000 parts per million (vol./vol.). The explosimeter is less sensitive; it measures gas as a percentage of the lower explosive limit (LEL) and percent by volume. The explosive limit of propane is 2.37 to 9.5 percent by volume in air (Merck, 1960).

Monitoring wells and borings to be sampled were left closed and undisturbed for at least 24 hours. At the time of sampling, a diaphragm pump or peristaltic pump was connected to the 1/4-inch (I.D.) polyethylene tubing that is permanently in place and extends downward to the sampling zone.

Field experiments with the OVA showed that a constant hydrocarbon reading occurred after five minutes of pumping at approximately one liter per minute. Subsequently, all routine samples were taken into air bags after removal of several liters of gas. The pump was disconnected after sampling and allowed to flush with fre air.

Results of the Hydrogeologic Investigation and Soil-Air Sampling Program

The study area is underlain by 50 to 100 feet of unconsolidated glacial material, consisting of till with occasional stratified and unstratified silts, sands, and gravels. These deposits are underlain by crystalline bedrock.

The water table occurs within the unconsolidated deposits at depths ranging from 20 to 30 feet below land surface. The surface of the water table slopes northward and eastward, generally conforming to the topography of the area (Figure 2). Ground water in the water-table zone moves in a northern and eastern direction.

The results of propane analyses in soil-air samples from the vadose zone are shown in Figure 3. Propane plumes resulted from gas main breaks at the two locations shown. This figure shows propane concentrations of samples drawn from wells that are screened in the middle and lower part of the unsaturated zone (15-30 feet). Concentration contour lines have been superimposed on the study area.

Propane concentrations in soil-air samples collected from wells screening the upper to middle unsaturated zone during the same time are shown on Figure 4. Comparison of Figure 3 and Figure 4 shows that the propane in soil-air is predominantly in the deeper part of the unsaturated zone.

It was noted that the area of highest concentration of propane (>10,000 ppm (vol./vol.)) in the larger plume was 200 feet north and downgradient from the gas main break indicating that the gas had migrated from the point of origin. Neither dissolved nor gaseous propane was detected in the subsurface at monitoring points upgradient from the known source. It should be noted that the smaller plume is still centered on the second gas main break, indicating that this break occurred more recently and the gas had not yet migrated. In fact, the second gas main leak had remained undetected until our soil-air survey had been completed.

Propane Removal Program

Before a full-scale gas removal system was initiated, several pilot studies were conducted to determine if propane could be removed from the vadose zone, and if so, how effectively. A plan was developed to utilize vacuum through the monitoring wells to evacuate the gas plume.

After researching several recovery methods, such as attaching small vacuum devices (diaphragm and peristaltic pumps) to the wells, the most feasible and effective method appeared to be the use of aspiration devices or eductors. Eductors could easily be attached to the wells and moved to

other wells, if necessary, and several (up to 10) could be connected to one air compressor and operated at the same time. Figure 5 shows the propane removal system in a cross-sectional view. Compressed air passing through the venturi produces a vacuum inside the well casing and draws gases out of pore spaces of the unsaturated soils. The gases are evacuated from the ground and discharged into the atmosphere. The high rate of discharge from the air compressor was expected to dilute the propane to concentrations below 5 percent of the LEL.

Pumping tests were conducted to determine the change in propane concentrations over time in the removal wells and in nearby observation wells. The system was alternately pumped for 24 hours and then shut down for 24 hours to allow propane concentrations to reach equilibrium in the well casing. Soil air samples were collected and analyzed by gas chromatography before each pumping cycle began. Results of the pumping test showed a decline to 10 percent of the original propane levels after the first 48-hour cycle. Propane concentrations were observed to rise to 50 to 70 percent of their original levels by the end of the 4th to 6th pumping cycle, then decline after subsequent pumping cycles. Similar trends were observed in observation wells surrounding the pumping wells. This information indicated that the gas plume is highly mobile in the subsurface and that it was possible to remove propane, if only locally, by aspiration.

A full-scale recovery program began with the addition of recovery wells in areas of highest propane concentration. These wells, along with existing monitoring wells within the plume, were fitted with venturi de-

vices and connected in series or independently to a single air compressor. Figure 6 shows the airline configuration. Pressures of 50 to 90 pounds per square inch were maintained at each well head causing the pressure in the well casing to decline to approximately 8 atmospheres. The system was operated 12 hours per day for 6 days a week and was allowed to recover for 48 to 72 hours every two weeks so that a round of soil-air samples could be collected and analyzed to monitor removal progress. The results of these analyses indicated that the recovery system decreased the overall concentration of propane in the subsurface. After three months of aspiration, concentrations were reduced to trace amounts.

Summary and Conclusions

The tested propane gas which is heavier than air, traveled downward through the unsaturated zone until reaching the water table. A portion of the gas dissolved into the saturated zone but the bulk of the remaining gas blanketed the lower portion of the vadose zone 15-30 feet below land surface.

The major gas plume traveled 200 feet downgradient from the gas main break between the time the leak was repaired and the subsurface investigation began (approximately 1-1/2 years). A smaller gas plume was discovered near a second gas main break which had remained undetected until the time of the subsurface investigation.

The results of a study to determine the extent of propane in the saturated zone were helpful in "fingerprinting" the extent and location of the

gas plume in the unsaturated zone and formed the basis for the design and location of gas removal wells.

Pilot testing of specialized gas sampling methods and protocols was carried out to insure that soil-gas samples were representative of actual conditions in the unsaturated zone and that consistent and reproducible analytical results were obtained.

As a safety precaution it was necessary to continuously monitor propane in the atmosphere during all phases of the field investigation and cleanup operation. Several explosimeters and organic vapor analyzers were helpful in this regard.

42. To F. Aljibury, SWRCB; From Daniel F. Kriege; November 22, 1984; Subject: Santa Clara County Guidelines for Underground Storage (missing)